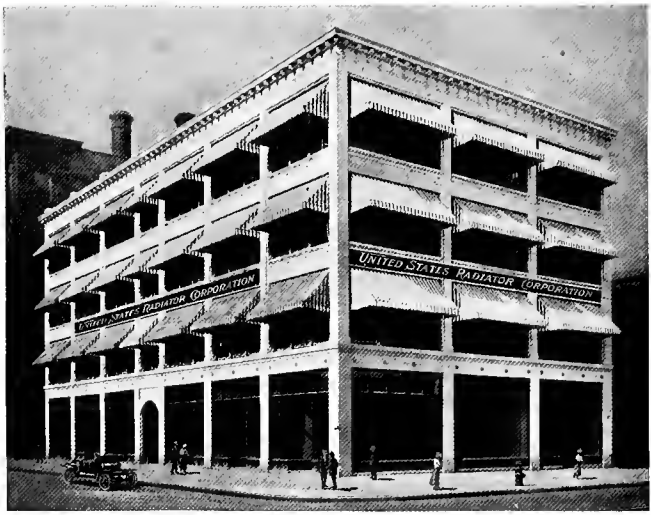
THE COMPLETE LINE

UNITED STATES RADIATOR CORPORATION



GENERAL OFFICES, BROADWAY AND GRAND RIVER AVE., DETROIT, MICH.

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FOREWORD

WE TAKE pleasure in offering this catalog of our product for the use of those interested in the design and erection of heating apparatus.

Our constant effort is to produce heating material of high efficiency and accurate workmanship. Such material provides the owner with a heating plant which can be operated with the least expense possible and can be erected by the heating contractor at a low cost for labor.

To this end, our Experimental, Engineering and Manufacturing Departments are continuously applying the latest scientific discoveries to the design and perfection of new heating apparatus.

The product of this Company so designed and perfected is far more economical and efficient than earlier types still offered the heating trade.

CAPITOL BOILERS and *UNITED STATES RADIATORS* are made under the most exacting standards and modern methods known to manufacturers. All boilers and radiators are assembled, inspected and tested before leaving our factories, insuring perfect material on arrival at destination.

Our six manufacturing plants, seven distributing warehouses at principal shipping centers, and twelve branch sales offices enable us to serve our patrons without unnecessary delay.

Thus equipped, we solicit the same loyal support of Architects, Engineers and Contractors that has been accorded us in the past.

Yours very truly,

UNITED STATES RADIATOR CORPORATION
Detroit, Mich.

August 1st, 1915

Prices herein supersede all former lists, and are subject to change without notice. Discounts quoted to regular trade only.

Guarantee

We absolutely guarantee the published capacities of CAPITOL BOILERS *in pounds of steam at the boiler outlet, provided that the area of the vertical smoke flue and its height shall be great enough to provide a sufficient draft to consume with proper combustion the required amount of fuel per hour, and the best grades of anthracite coal are used.*

See Basis of Ratings, Page 206

We do not recommend the use of a pipe coil or cast iron section in the fire pot for hot water supply, but advise the use of a separate water heater.

187 Steam

187 Water

STEAM

No.	*8-Hour Rating Square Feet	Price List	Height of Water Line Inches	Fire-pot Area Inches	Base Dimensions Inches	Outlets and Inlets Inches
184	400	$208.00	40½	20 x 17½	25½ x 20¼	2–3
185	550	245.00	40½	20 x 24	25½ x 26½	2–3
186	700	310.00	40½	20 x 30	25½ x 32¾	2–3
187	850	355.00	40½	20 x 36	25½ x 39	2–3

Inclusive of trimmings—HEIGHT, 65 inches; WIDTH, 36¾ inches.

WATER

184	650	$198.00	.....	20 x 17½	25½ x 20¼	2–3
185	910	235.00	.....	20 x 24	25½ x 26½	2–3
186	1170	300.00	.....	20 x 30	25½ x 32¾	2–3
187	1430	345.00	.....	20 x 36	25½ x 39	2–3

For smoke pipe and other measurements, see page 34.

Do not bush flow pipe outlets—connect them full size to the main.

Use a larger boiler for soft coal.

For wood-burning boilers, fire door 15¾" x 11" can be furnished on boilers shipped from factory.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel (Anthracite) Lbs.	Recharging Reserve Lbs.	Fuel Consumed Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity Lbs.	*8-Hour Rating Square Feet
184	119	24	95	8.5	800	400
185	163	33	130	8.5	1100	550
186	207	42	165	8.5	1400	700
187	250	50	200	8.5	1700	850

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

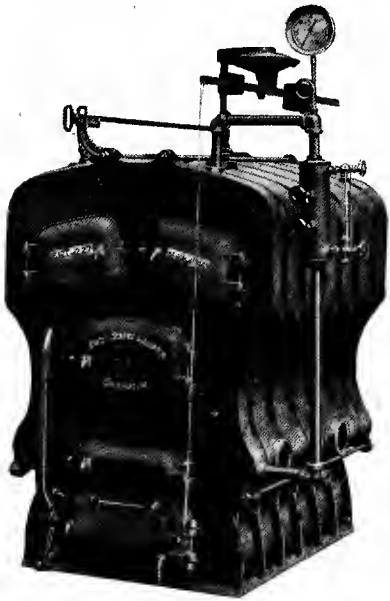
Chimneys of the size and heights given in table, page 214, should provide sufficient draft for hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

*See Basis of Boiler Ratings, page 206.



227 Steam

227 Water

STEAM

No.	*8-Hour Rating Square Feet	Price List	Height Water Line Inches	Fire-pot Area Inches	Base Dimensions Inches	Outlets and Inlets Inches
225	800	$340.00	43½	27 x 23	30 x 27	2–3
226	1000	400.00	43½	27 x 29	30 x 33¼	2–3
227	1200	460.00	43½	27 x 35	30 x 39½	2–3
228	1400	520.00	43½	27 x 42	30 x 45¾	3–3

Inclusive of trimmings—HEIGHT, 66½ inches; WIDTH, 44½ inches.

WATER

225	1320	$330.00	.....	27 x 23	30 x 27	2–3
226	1650	390.00	.....	27 x 29	30 x 33¼	2–3
227	1980	450.00	.....	27 x 35	30 x 39½	2–3
228	2310	510.00	.....	27 x 42	30 x 45¾	3–3

For smoke pipe and other measurements, see page 34.

Do not bush flow pipe outlets—connect them full size to the main.

Use a larger boiler for soft coal.

For wood-burning boilers, fire door 19¾" x 11" can be furnished on boilers shipped from factory.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel (Anthracite) Lbs.	Recharging Reserve Lbs.	Fuel Consumed Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity Lbs.	*8-Hour Rating Square Feet
225	237	48	189	8.5	1600	800
226	295	59	236	8.5	2000	1000
227	354	71	283	8.5	2400	1200
228	413	83	330	8.5	2800	1400

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

*See Basis of Boiler Ratings, page 206.

257 Steam

257 Water

STEAM

No.	*8-Hour Rating Square Feet	Price List	Height Water Line Inches	Fire Pot Area Inches	Base Dimensions Inches	Outlets and Inlets Inches
255	1100	$430 00	47	27 x 31⅜	35 x 37¼	2–4
256	1350	505 00	47	27 x 39⅜	35 x 45¼	2–4
257	1600	580 00	47	27 x 47⅜	35 x 53¼	3–4
258	1850	655 00	47	27 x 55⅜	35 x 61¼	3–4

Inclusive of trimmings—HEIGHT, 73 inches; WIDTH, 49½ inches.

WATER

255	1825	$420 00	. . . . .	27 x 31⅜	35 x 37¼	2–4
256	2225	495 00	. . . . .	27 x 39⅜	35 x 45¼	2–4
257	2650	570 00	. . . . .	27 x 47⅜	35 x 53¼	3–4
258	3050	645 00	. . . . .	27 x 55⅜	35 x 61¼	3–4

For smoke pipe and other measurements, see page 34.

Do not bush flow pipe outlets—connect them full size to the mains.

Use a larger boiler for soft coal.

For wood burning boilers, fire door 21" x 11¾" can be furnished on boilers shipped from factory.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel (Anth'cite) Lbs.	Recharging Reserve Lbs.	Fuel Consumed Lbs.	Evaporation Per Lb. Fuel †Lbs.	TotalSteam Capacity Lbs.	*8-Hr. Rating Sq. Ft.
255	313	63	250	8.8	2200	1100
256	384	77	307	8.8	2700	1350
257	455	91	364	8.8	3200	1600
258	526	105	421	8.8	3700	1850

When fuel is consumed in shorter or longer period, the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divide by 240 for steam and 150 for water, gives 8-hour rating.

When thought necessary on account of draft conditions, the length of grate can be reduced by taking out one or more grate bars and filling in with fire brick.

*See basis of Boiler Ratings, page 206.

G 278 Steam

G 278 Water

STEAM

No.	*8-Hour Rating Square Feet	Price List	Height Water Line Inches	Fire-Pot Area Inches	Base Dimensions Inches	Outlets and Inlets Inches
G 276	1350	$505.00	45½	32 x 31	36 x 36	2–4
G 277	1650	595.00	45½	32 x 38	36 x 42¾	2–4
G 278	1950	685.00	45½	32 x 45	36 x 49½	3–4
G 279	2250	775.00	45½	32 x 51	36 x 56¼	3–4

Inclusive of trimmings —HEIGHT, 72 inches; WIDTH, 50¾ inches.

WATER

G 276	2230	$495.00	.....	32 x 31	36 x 36	2–4
G 277	2720	585.00	.....	32 x 38	36 x 42¾	2–4
G 278	3210	675.00	.....	32 x 45	36 x 49½	3–4
G 279	3700	765.00	.....	32 x 51	36 x 56¼	3–4

For smoke pipe and other measurements, see page 34.

Do not bush flow pipe outlets—connect them full size to the mains.

Use a larger boiler for soft coal.

For wood burning boilers, fire door 15¾" x 11", can be furnished on boilers shipped from factory.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel (Anthracite) Lbs.	Recharging Reserve Lbs.	Fuel Consumed Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity Lbs.	*8-Hour Rating Square Feet
G 276	389	78	311	8.7	2700	1350
G 277	475	95	380	8.7	3300	1650
G 278	561	112	449	8.7	3900	1950
G 279	648	130	518	8.7	4500	2250

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

*See Basis of Boiler Ratings, page 206.

238 Steam

238 Water

STEAM

No.	*8-Hour Rating Square Feet	Price List	Height Water Line Inches	Fire-pot Area Inches	Base Dimensions Inches	Outlets and inlets Inches
235	1900	$ 670.00	53	37 x 32	41¼ x 36½	2–4
236	2350	797.00	53	37 x 40	41¼ x 44¾	2–4
237	2800	905.00	53	37 x 48	41¼ x 53	2–4
238	3250	995.00	53	37 x 56	41¼ x 61¼	3–4
239	3700	1085.00	53	37 x 64	41¼ x 69½	3–4
240	4150	1175.00	53	37 x 72	41¼ x 77¾	3–4

Inclusive of trimmings—HEIGHT, 74 inches; WIDTH, 60¼ inches.

WATER

235	3150	$ 655.00	.....	37 x 32	41¼ x 36½	2–4
236	3900	782.00	.....	37 x 40	41¼ x 44¾	2–4
237	4650	890.00	.....	37 x 48	41¼ x 53	2–4
238	5450	980.00	.....	37 x 56	41¼ x 61¼	3–4
239	6150	1070.00	.....	37 x 64	41¼ x 69½	3–4
240	6900	1160.00	.....	37 x 72	41¼ x 77¾	3–4

For smoke pipe and other measurements, see page 34.
Do not bush flow pipe outlets—connect them full size to the main.
Use a larger boiler for soft coal.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel (Anthracite) Lbs.	Recharging Reserve Lbs.	Fuel Consumed Lbs.	Evap'tion Per Lb. Fuel Lbs.	Total Steam Capacity Lbs.	*8-Hour Rating Sq. Ft.
235	540	108	432	8.8	3800	1900
236	669	134	535	8.8	4700	2350
237	797	160	637	8.8	5600	2800
238	924	185	739	8.8	6500	3250
239	1052	211	841	8.8	7400	3700
240	1180	236	944	8.8	8300	4150

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly fuel consumption.

To establish 8-hour steam rating in square feet divide, the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B.T.U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B.T.U., divided by 240 for steam and 150 for water, gives 8-hour rating.

When thought necessary on account of draft conditions, the length of grate can be reduced by taking out one or more grate bars and filling in with fire brick.

*See Basis of Boiler Ratings, page 206.

WN 278 Steam

WN 279 Water

STEAM

No.	*Rating Square Feet	Price List	Height Water Line Inches	Fire-pot Area Inches	Base Dimensions Inches	Outlets and Inlets Inches
WN 276	4550	$1250.00	66	50 x 45	57¾x 49⅝	3–5
WN 277	5475	1435.00	66	50 x 54	57¾x 58¾	3–5
WN 278	6400	1620.00	66	50 x 63	57¾x 67⅞	3–5
WN 279	7325	1805.00	66	50 x 72	57¾x 77	4–5
WN 280	8250	1990.00	66	50 x 81	57¾x 86⅛	4–5
WN 281	9175	2175.00	66	50 x 90	57¾x 95¼	4–5
WN 282	10100	2360.00	66	50 x 99	57¾x104⅜	4–5

Inclusive of trimming—HEIGHT, 97¾ inches; WIDTH, 82 inches.

WATER

WN 276	7475	$1230.00	.....	50 x 45	57¾x 49⅝	3–5
WN 277	9000	1415.00	.....	50 x 54	57¾x 58¾	3–5
WN 278	10525	1600.00	.....	50 x 63	57¾x 67⅞	3–5
WN 279	12050	1785.00	.....	50 x 72	57¾x 77	4–5
WN 280	13575	1970.00	.....	50 x 81	57¾x 86⅛	4–5
WN 281	15100	2155.00	.....	50 x 90	57¾x 95¼	4–5
WN 282	16625	2340.00	.....	50 x 99	57¾x104⅜	4–5

For smoke pipe and other measurements, see pages 33 and 34
Do not bush flow pipe outlets—connect them full size to the main.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Fuel Consumed Per Hour Lbs.	Evaporation Per Lb. Fuel Lbs.	Total Steam Capacity Lbs.	*Rating Sq. Ft.
WN 276	127	9	1138	4550
WN 277	153	9	1369	5475
WN 278	178	9	1600	6400
WN 279	204	9	1832	7325
WN 280	230	9	2063	8250
WN 281	255	9	2294	9175
WN 282	281	9	2525	10100

Laboratory Tests have demonstrated that available capacities on these boilers can be increased at least 25% by a corresponding increase in hourly coal consumption while maintaining average evaporative efficiency.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly coal consumption.

To establish rating in square feet, divide the total steam capacity in pounds by 0.25.

To determine hourly potential energy in B.T.U., multiply the total steam capacity by 970.

Hourly potential energy in B.T.U., divided by 240 for steam and 150 for water, gives rating in square feet.

When so specified we can furnish bridge wall plates thus reducing depth of fire pot by depth of one or more sections.

*See Basis of Boiler Rating, page 206.

625B Steam

625B Water

STEAM

No.	*8-Hour Rating Square Feet	Price List	Height Water Line Inches	Fire-pot Area Inches	Base Dimensions Inches	Outlets and Inlets Inches
525	700	$310.00	45	25x25½	25½x32	2–4
625	875	363.00	45	25x32	25½x38½	2–4
725	1050	415.00	45	25x38½	25½x45	2–4
825	1225	468.00	45	25x45	25½x51½	2–4

Inclusive of trimmings—HEIGHT, 66 inches; WIDTH, 41 inches.

WATER

525	1150	$300.00	.....	25x25½	25½x32	2–4
625	1450	353.00	.....	25x32	25½x38½	2–4
725	1725	405.00	.....	25x38½	25½x45	2–4
825	2025	458.00	.....	25x45	25½x51½	2–4

For smoke pipe and other measurements, see page 36.
Do not bush flow pipe outlets—connect them full size to the main.
Use a larger boiler for soft coal.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel (Anthracite) Lbs.	Recharging Reserve Lbs.	Fuel Consumed Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity Lbs.	*8-Hour Rating Square Feet
525	207	42	165	8.5	1400	700
625	258	52	206	8.5	1750	875
725	309	62	247	8.5	2100	1050
825	362	73	289	8.5	2450	1225

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft to consume with proper combustion the required amount of fuel per hour.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

*See Basis of Boiler Ratings, page 206.

737 B Steam

737B Water

STEAM

No.	*8-Hour Rating Square Feet	Price List	Height Water Line Inches	Fire-pot Area Inches	Base Dimensions Inches	Tappings	
						Flow Inches	Return Inches
1537B	1350	$505.00	50½	37 x 30	35½x38½	2–4	2–4
537B	1500	550.00	50½	37 x 30	35½x38½	2–4	2–4
1637B	1700	610.00	50½	37 x 37½	35½x46	2–4	2–4
637B	1925	678.00	50½	37 x 37½	35½x46	2–4	2–4
1737B	2150	744.00	50½	37 x 45	35½x53½	3–4	2–4
737B	2375	804.00	50½	37 x 45	35½x53½	3–4	2–4
1837B	2600	859.00	50½	37 x 52½	35½x61	3–4	2–4
837B	2825	910.00	50½	37 x 52½	35½x61	3–4	2–4
1937B	3075	959.00	50½	37 x 60	35½x68½	4–4	2–4
937B	3325	1008.00	50½	37 x 60	35½x68½	4–4	2–4

Inclusive of trimmings—HEIGHT, 72⅛ inches; WIDTH, 55⅜ inches.

WATER

1537B	2225	$495.00	.....	37 x 30	35½x38½	2–4	2–4
537B	2475	540.00	.....	37 x 30	35½x38½	2–4	2–4
1637B	2800	600.00	.....	37 x 37½	35½x46	2–4	2–4
637B	3175	668.00	.....	37 x 37½	35½x46	2–4	2–4
1737B	3550	724.00	.....	37 x 45	35½x53½	3–4	3–4
737B	3925	784.00	.....	37 x 45	35½x53½	3–4	3–4
1837B	4300	839.00	.....	37 x 52½	35½x61	3–4	3–4
837B	4650	890.00	.....	37 x 52½	35½x61	3–4	3–4
1937B	5075	939.00	.....	37 x 60	35½x68½	4–4	4–4
937B	5500	988.00	.....	37 x 60	35½x68½	4–4	4–4

For smoke pipe and other measurements, see page 36. Do not bush flow pipe outlets—connect them full size to the main. Use a larger boiler for soaft coal.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Labratory Tests)

No.	Adequate Fuel (Anthracite) Lbs.	Recharging Reserve Lbs.	Fuel Consumed Lbs.	Evaporation per Lh. Fuel Lbs.	Total Steam Capacity Lbs.	*8-Hour Rating Square Feet
1537	398	80	318	8.5	2700	1350
537	432	87	345	8.7	3000	1500
1637	500	100	400	8.5	3400	1700
637	554	111	443	8.7	3850	1925
1737	633	127	506	8.5	4300	2150
737	683	137	546	8.7	4750	2375
1837	765	153	612	8.5	5200	2600
837	813	163	650	8.7	5650	2825
1937	905	181	724	8.5	6150	3075
937	957	192	765	8.7	6650	3325

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

*See Basis of Boiler Rating, page 206.

No. 3130
Steam Boiler

No. 4140
Water Boiler

CAPITOL WINCHESTER

STEAM

No.	*8-Hour Rating Square Feet	List Price	Actual Grate Diam. Inches	Grate Area Square Feet	Height Water Line Inches	Height Outlets Inches	Outlets and Inlets Inches	Smoke Pipe Inches
3130	200	$114.00	15	1.23	$44\frac{3}{16}$	$49\frac{3}{16}$	$2–2\frac{1}{2}$	6
3140	225	123.00	15	1.23	$48\frac{3}{16}$	$53\frac{9}{16}$	$2–2\frac{1}{2}$	6

WATER

4130	325	$ 96.50	15	1.23	.....	$43\frac{15}{16}$	$2–2\frac{1}{2}$	6
4140	375	105.50	15	1.23	.....	$47\frac{15}{16}$	$2–2\frac{1}{2}$	6

For other measurements, see page 38.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel Anthracite, Lbs.	Recharging Reserve, Lbs.	Fuel Consumed, Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity, Lbs.	*8-Hour Rating, Square Feet	Fuel Available 80% Fuel Capacity, Lbs.
3130	63	13	50	8.00	400	200	60
3140	67	14	53	8.50	450	225	63

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

A larger size of fire-pot is recommended when soft coal is used.

*See Basis of Boiler Ratings, page 206.

No. 3230
Steam Boiler

No. 4240
Water Boiler

CAPITOL WINCHESTER

STEAM

No.	*8-Hour Rating Square Feet	List Price	Actual Grate Diam. Inches	Grate Area Square Feet	Heigbt Water Line Inches	Height Outlets Inches	Outlets and Inlets Inches	Smoke Pipe Inches
3230	250	$132.00	17	1.58	44⅜	49½	2–2½	6
3240	300	149 50	17	1.58	49	54 1/16	2–2½	6

WATER

4230	425	$123.00	17	1.58	.....	44¼	2–2½	6
4240	500	140.50	17	1.58	.....	48 13/16	2–2½	6

For other measurements, see page 38

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel Anthracite, Lbs.	Recharging Reserve, Lbs.	Fuel Consumed, Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity, Lbs.	*8-Hour Rating, Square Feet	Fuel Available 80% Fuel Capacity, Lbs.
3230	74	15	59	8.50	500	250	73
3240	87	18	69	8.75	600	300	85

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water gives 8-hour rating.

A larger size of fire-pot is recommended when soft coal is used.

*See Basis of Boiler Ratings, page 206.

No. 3330
Steam Boiler

No. 4340
Water Boiler

CAPITOL WINCHESTER

STEAM

No.	*8 Hour Rating Square Feet	List Price	Actual Grate Diam. Inches	Grate Area Square Feet	Height Water Line Inches	Height Outlets Inches	Outlets and Inlets Inches	Smoke Pipe Inches
3330	325	$158.00	20	2.18	$44\frac{3}{16}$	$49\frac{15}{16}$	2–2½	7
3340	375	180.00	20	2.18	49	$54\frac{3}{4}$	2–2½	7
3350	425	199.50	20	2.18	$53\frac{13}{16}$	$59\frac{9}{16}$	2–2½	7

WATER

4330	550	$153.50	20	2.18	.....	$44\frac{11}{16}$	2–2½	7
4340	625	171.00	20	2.18	.....	$49\frac{1}{2}$	2–2½	7
4350	700	191.00	20	2.18	.....	$54\frac{5}{16}$	2–2½	7

For other measurements see page 38.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel Anthracite, Lbs.	Recharging Reserve, Lbs.	Fuel Consumed, Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity, Lbs.	*8-Hour Rating, Square Feet	Fuel Available 80% Fuel Capacity, Lbs.
3330	94	19	75	8.75	650	325	98
3340	105	21	84	9.00	750	375	110
3350	115	23	92	9.25	850	425	120

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

A larger size of fire-pot is recommended when soft coal is used.

*See Basis of Boiler Ratings, page 206.

No. 3440
Steam Boiler

No. 4450
Water Boiler

CAPITOL WINCHESTER

STEAM

No.	*8-Hour Rating Square Feet	List Price	Actual Grate Diam. Inches	Grate Area Square Feet	Height Water Line Inches	Height Outlets Inches	Outlets and Inlets Inches	Smoke Pipe Inches
3440	500	$219.50	24½	3.27	50⅝	56⅛	2–3	8
3450	575	240.00	24½	3.27	55½	61	2–3	8
†3460	650	287.50	24½	3.27	60 5/16	65 13/16	2–3	8

WATER

4440	825	$210.50	24½	3.27	.....	50⅞	2–3	8
4450	950	230.00	24½	3.27	.....	55¾	2–3	8
†4460	1075	277.50	24½	3.27	.....	60 9/16	2–3	8

For other measurements, see page 38.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel Anthracite, Lbs.	Recharging Reserve, Lbs.	Fuel Consumed, Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity, Lbs.	*8-Hour Rating, Square Feet	Fuel Available 80% Fuel Capacity, Lbs.
3440	143	29	114	8.80	1000	500	149
3450	159	32	127	9.10	1150	575	166
3460	174	35	139	9.40	1300	650	181

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

†Strong draft is necessary when these boilers are used for soft coal.

A larger size of fire-pot is recommended when soft coal is used.

*See Basis of Boiler Ratings, page 206.

No. 3550
Steam Boiler

No. 4550
Water Boiler

CAPITOL WINCHESTER

STEAM

No.	*8-Hour Rating Square Feet	List Price	Actual Grate Diam. Inches	Grate Area Square Feet	Height Water Line Inches	Height Outlets Inches	Outlets and Inlets Inches	Smoke Pipe Inches
3540	750	$317.00	29	4.59	$52\frac{1}{16}$	$57\frac{9}{16}$	2–4	9
3550	850	346.00	29	4.59	$56\frac{15}{16}$	$62\frac{7}{16}$	2–4	9
†3560	950	375.00	29	4.59	$61\frac{13}{16}$	$67\frac{5}{16}$	2–4	9

WATER

4540	1225	$303.00	29	4.59	.....	$52\frac{5}{16}$	2–4	9
4550	1400	336.00	29	4.59	.....	$57\frac{9}{16}$	2–4	9
†4560	1575	365.00	29	4.59	.....	$62\frac{1}{16}$	2–4	9

For other measurements, see page 38.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel Anthracite, Lbs.	Recharging Reserve, Lbs.	Fuel Consumed, Lbs.	Evaporation per Lb., Fuel Lbs.	Total Steam Capacity, Lbs.	*8-Hour Rating, Square Feet	Fuel Available 80% Fuel Capacity, Lbs.
3540	215	43	172	8.75	1500	750	223
3550	237	48	189	9.00	1700	850	245
3560	258	52	206	9.25	1900	950	266

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

†Strong draft is necessary when these boilers are used for soft coal.

A larger size of fire-pot is recommended when soft coal is used.

*See Basis of Boiler Ratings, page 206.

No. 3650
Steam Boiler

No. 4660
Water Boiler

CAPITOL WINCHESTER

STEAM

No.	*8-Hour Rating Square Feet	List Price	Actual Grate Diam. Inches	Grate Area Square Feet	Height Water Line Inches	Height Outlets inches	Outlets and Inlets Inches	Smoke Pipe Inches
3640	1100	$420.00	33	5.94	53 9/16	59 1/16	2–4	10
3650	1225	455.00	33	5.94	58 7/16	63 15/16	2–4	10
†3660	1350	492.00	33	5.94	63 5/16	68 13/16	2–4	10

WATER

4640	1825	$410.00	33	5.94	.....	53 13/16	2–4	10
4650	2025	442.00	33	5.94	.....	58 11/16	2–4	10
†4660	2225	482.00	33	5.94	.....	63 9/16	2–4	10

For other measurements, see page 38. Equipped with triangular grates only.

BASIS USED FOR ESTABLISHING RATINGS

(Result of Laboratory Tests)

No.	Adequate Fuel Anthracite, Lbs.	Recharging Reserve, Lbs.	Fuel Consumed, Lbs.	Evaporation per Lb. Fuel Lbs.	Total Steam Capacity, Lbs.	*8-Hour Rating, Square Feet	Fuel Available 80% Fuel Capacity, Lbs.
3640	324	65	259	8.50	2200	1100	299
3650	353	71	282	8.70	2450	1225	325
3660	380	76	304	8.90	2700	1350	350

When fuel is consumed in shorter or longer period the hourly capacity is proportionately increased or decreased.

Chimneys of the size and heights given in table, page 214, should provide sufficient draft for required hourly fuel consumption.

To establish 8-hour steam rating in square feet, divide the total steam capacity in pounds by eight and divide by 0.25.

To determine hourly potential energy in B. T. U., divide total steam capacity by eight and multiply by 970.

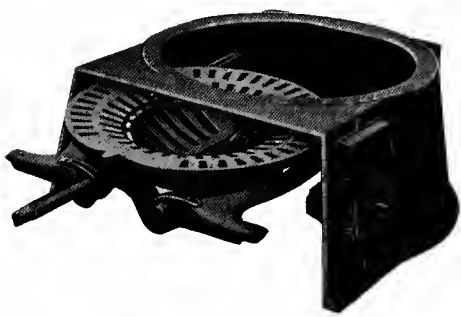
Hourly potential energy in B. T. U., divided by 240 for steam and 150 for water, gives 8-hour rating.

†Strong draft is necessary when these boilers are used for soft coal.

A larger size of fire-pot is recommended when soft coal is used.

*See Basis of Boiler Ratings, page 206.

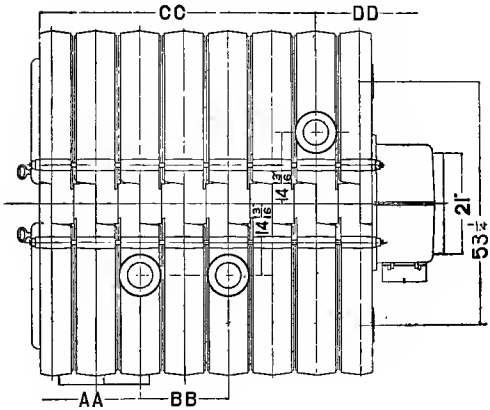
Sectional View



Rotary Duplex Grate

TAPPING MEASUREMENTS

WN270 SERIES



Cut Showing Top of Boiler

MEASUREMENTS IN INCHES

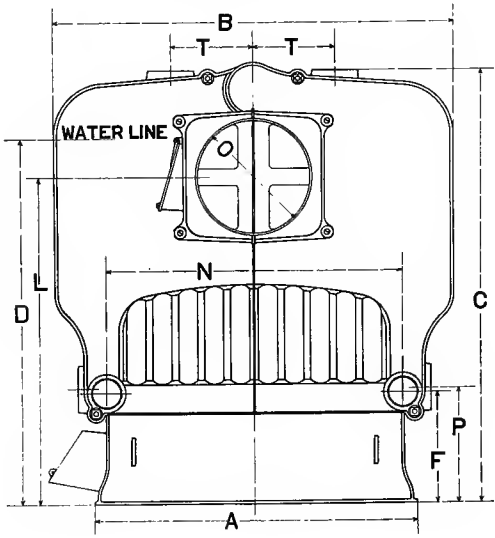
Sections	Right Side		Left Side	
	AA	BB	CC	*DD
6	20 11/16"	....	11 5/8"	27 1/4"
7	20 11/16"	18 3/16"	48 "	....
8	20 11/16"	18 3/16"	57 1/16"	....
9	20 11/16"	27 5/16"	38 7/8"	27 5/16"
10	20 11/16"	36 3/8"	38 7/8"	36 3/8"
11	20 11/16"	45 1/2"	48 "	36 3/8"
12	20 11/16"	45 1/2"	48 "	45 1/2"

Flow and return tappings are on the same half sections.

*DD.—Distance from center to center of tappings on left side of 276, 279, 280, 281 and 282 Boilers.

The above measurements are subject to variations in assembling.

MEASUREMENTS OF 180, 220, 250, G270 230, WN270 BOILERS



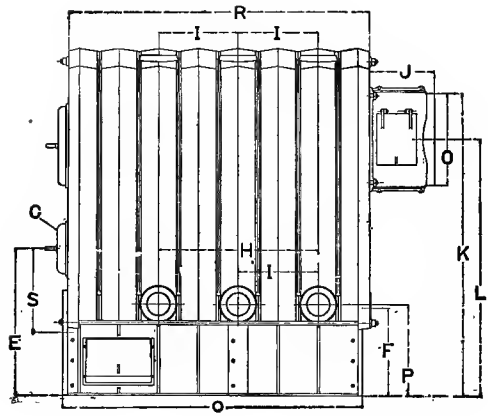


TABLE OF MEASUREMENTS OF 180, 220, 250, G270, 230, WN270 BOILERS IN INCHES

	180	220	250	G270	230	WN270
A	25½″	30″	34¼	36″	41¼″	57¾″
B	28½″	37½″	39 1/16	43½″	48½″	71¾″
C	48″	50¾″	58⅝	55¾″	65″	77¾″
D	40½″	43½″	47	45½″	53″	66″
E	25½″	25¾″	28 15/16	27½″	29″	33¾″
F	....	....	.....	....	....	20⅛″
G	7½″ x11½″	8″ x13″	9¾ x 14½	8″x13″	9¾″ x15¼″	10″x17″
H	25″	25″	257—32″ 258—40″	27″	33″	36⅜″
I	12½″	12½″	256—24″ all others 16″	13½″	16½″	18 3/16″
J	12″	14″	11½″	16″	14″	15″
†K	44½″	48″	52 5/32″	50″	57″	69¼″
†L	37″	39″	45 8/32″	41½″	50″	58¾″
⁂N	....	....	.....	....	....	53¼″
O	10″	12″	12″	14″	14″	21″
P	14¼″	14¾″	17¼″	16″	17″	20⅞″
Q	184—20¾-in.: add 6½-in. for each addition-al section.	225 — 27-in. add 6½-in.for each addition-al section.	255—37¼-in.; add 8-in. for each addition-al section.	G276--36-in.:add6½-in.for each addition-al section.	235— 36½-in.: add 8½-in. for each addition-al section.	WN276—49 ⅛ in.: add 9½ -in- for each additional section.
R	184—20¾-in.: add 6½-in. for each addition-al section.	225 — 27-in. add 6½-in.for each addition-al section.	255—36½-in.; add 8-in. for each additional section.	G276-35½ in. add 6½-in.for each additional section.	235— 37½-in.: add 8½-in. for each addition-al section.	WN276-50 1/16 in. add9½ in. for each additional sections.
*S	14¼″	14½″	17″	15½″	18″	19¼″
‡T	....	....	.....	....	....	14 13/16″

*Center of fire door above grate level.

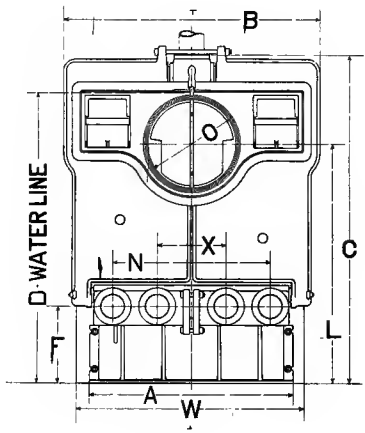
†Smoke hood can be furnished with top outlet on 180, 220, 250 and G270, 230 and WN270 Series.

‡Additional measurements, page 33.

⁂Back openings must be connected across back of boiler with a pipe not less than 3 inches in diameter.

CAPITOL SECTIONAL BOILER MEASUREMENTS

25B AND 37B SERIES



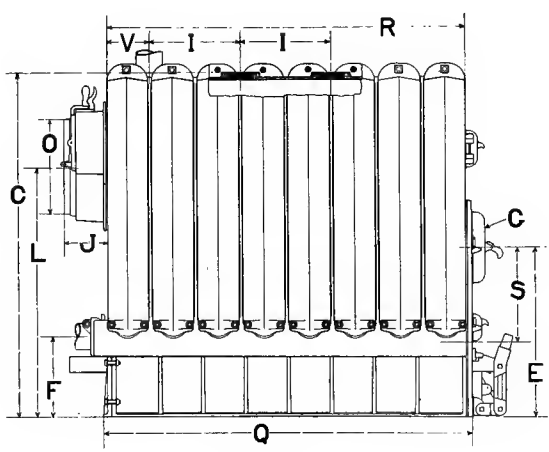
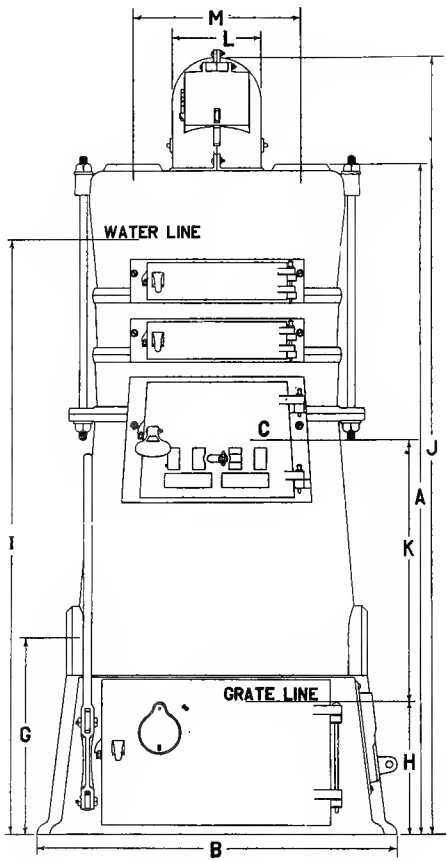


TABLE OF MEASUREMENTS

25B AND 37B SERIES

	25B Series	37B Series
A	25½"	35½"
B	31"	44¾"
C	50½"	57¼"
D	45"	50½"
E	27½"	28"
F	13½"	13½"
G	10"x17"	11"x21"
I	525—13-in. 625-725-825—19½-in.	15"
J	5⅞"	7⅛"
L	40¼"	41¾"
N	16½"	27½"
O	12"	16"
Q	525—32-in. add 6½-in. for each additional section	537—38½-in. add 7½-in. for each additional section
R	525—30⅛-in. add 6½-in. for each additional section	537—36¼-in. add 7½-in. for each additional section
*S	15"	15¼"
V	625—5¼-in. 525-725—11¾-in. 825—18¼-in.	6⅞"
W	29"	39¾"
X	.....	12-in. for 7, 8 and 9 sections only

*Center of fire door above grate level.



Sectional View

(for Detailed Measurements, see opposite page)

Steam trimmings extend 13″ above outlets on 3100 and 3200 series, all others 10¾″.

CAPITOL-WINCHESTER BOILERS

MEASUREMENTS

Steam

Size	A	B	C	G	H	I	J	K	L	M
3130	49 3/16	24 1/4	8 x 8	16 1/8	8 7/8	44 3/16	56 3/8	23 1/2	6	13 11/16
3140	53 9/16	24 1/4	8 x 8	16 1/8	8 7/8	48 3/16	60 3/4	23 1/2	6	13 11/16
3230	49 1/2	26 1/4	8 x 9	16 1/8	8 7/8	44 3/8	56 11/16	23 1/2	6	13 11/16
3240	54 1/16	26 1/4	8 x 9	16 1/8	8 7/8	49	61 1/4	23 1/2	6	13 11/16
3330	49 5/16	29 5/16	9 x 11	16 1/8	8 7/8	44 3/16	58 1/8	23 1/2	7	13 11/16
3340	54 3/4	29 5/16	9 x 11	16 1/8	8 7/8	49	62 13/16	23 1/2	7	13 11/16
3350	59 9/16	29 5/16	9 x 11	16 1/8	8 7/8	53 13/16	67 3/4	23 1/2	7	13 11/16
3440	56 1/8	35	9 x 12	17 1/2	9 7/8	50 5/8	65 5/16	24 1/8	8	16 5/16
3450	61	35	9 x 12	17 1/2	9 7/8	55 1/2	70 9/16	24 1/8	8	16 5/16
3460	65 13/16	35	9 x 12	17 1/2	9 7/8	60 5/16	75	24 1/8	8	16 5/16
3540	57 9/16	40	9 x 13	19	10 9/16	52 1/16	67 11/16	24 11/16	9	17 13/16
3550	62 7/16	40	9 x 13	19	10 9/16	56 15/16	72 9/16	24 11/16	9	17 13/16
3560	67 5/16	40	9 x 13	19	10 9/16	61 13/16	77 7/16	24 11/16	9	17 13/16
3640	59 1/16	44 3/4	9 x 14	20 1/2	12 1/16	53 9/16	70 3/16	24 11/16	10	21 7/16
3650	63 15/16	44 3/4	9 x 14	20 1/2	12 1/16	58 7/16	75 1/16	24 11/16	10	21 7/16
3660	68 13/16	44 3/4	9 x 14	20 1/2	12 1/16	63 5/16	79 15/16	24 11/16	10	21 7/16

CAPITOL-WINCHESTER BOILERS

MEASUREMENTS

Water

Size	A	B	C	G	H	J	K	L	M
4130	43 15/16	24 1/4	8 x 8	16 1/8	8 7/8	51 1/8	23 1/2	6	13 11/16
4140	47 15/16	24 1/4	8 x 8	16 1/8	8 7/8	55 1/2	23 1/2	6	13 11/16
4230	44 1/4	26 1/4	8 x 9	16 1/8	8 7/8	51 7/16	23 1/2	6	13 11/16
4240	48 13/16	26 1/4	8 x 9	16 1/8	8 7/8	56	23 1/2	6	13 11/16
4330	44 1/16	29 5/16	9 x 11	16 1/8	8 7/8	52 7/8	23 1/2	7	13 11/16
4340	49 1/2	29 5/16	9 x 11	16 1/8	8 7/8	57 11/16	23 1/2	7	13 11/16
4350	54 5/16	29 5/16	9 x 11	16 1/8	8 7/8	62 1/2	23 1/2	7	13 11/16
4440	50 7/8	35	9 x 12	17 1/2	9 7/8	60 1/16	24 1/8	8	16 5/16
4450	55 3/4	35	9 x 12	17 1/2	9 7/8	64 15/16	24 1/8	8	16 5/16
4460	60 9/16	35	9 x 12	17 1/2	9 7/8	69 3/4	24 1/8	8	16 5/16
4540	52 1/16	40	9 x 13	19	10 9/16	62 7/16	24 11/16	9	17 13/16
4550	57 3/16	40	9 x 13	19	10 9/16	67 5/16	24 11/16	9	17 13/16
4560	62 1/16	40	9 x 13	19	10 9/16	72 3/16	24 11/16	9	17 13/16
4640	53 13/16	44 3/4	9 x 14	20 1/2	12 1/16	64 15/16	24 11/16	10	21 7/16
4650	58 1/16	44 3/4	9 x 14	20 1/2	12 1/16	69 13/16	24 11/16	10	21 7/16
4660	63 9/16	44 3/4	9 x 14	20 1/2	12 1/16	74 11/16	24 11/16	10	21 7/16

Capitol Gas Boiler, No. 5, steam

Capitol Gas Boiler, No. 5, water

STEAM

No.	Rating Square Feet	Price List	Height Water Line Inches	Length Inches	Smoke Pipe Inches	Outlets and inlets, Inches	Total Steam Capty. Lbs.	Gas Conn. Inches
3	350	150.09	37	17	1–6	1–3	89	1
4	475	190.00	37	22	1–6	2–3	120	1
5	600	230.00	37	27	2–6	2–3	151	1¼
6	725	270.00	37	32	2–6	2–3	182	1¼
7	850	310.00	37	37	2–6	3–3	213	1¼
8	975	350.00	37	42	2–6	3–3	244	1½
9	1100	390.00	37	47	2–6	4–3	275	1½
10	1225	430.00	37	52	2–6	4–3	306	1½

Depth, 21 inches; Height, 41 inches.

Inclusive of Trimmings, Height, 56 inches. Add to Length, 10 inches.

Distance from center of flow outlet to face of return inlet, $17\frac{13}{16}$.

Distance from center of return inlet to face of flow outlet, $25\frac{1}{8}$.

Do not bush flow pipe outlets—connect them full size to the main.

WATER

No.	Rating Square Feet	Price List	Length Inches	Smoke Pipe Inches	Outlets and Inlets Inches	Hourly Potential Energy B. T. U.	Tank Capty. Gallons
3	600	130.00	17	1–6	1–3	90,000	431
4	800	170.00	22	1–6	2–3	120,000	575
5	1000	210.00	27	2–6	2–3	150,000	719
6	1200	250.00	32	2–6	2–3	180,000	863
7	1400	290.00	37	2–6	3–3	210,000	1007
8	1600	330.00	42	2–6	3–3	240,000	1151
9	1800	370.00	47	2–6	4–3	270,000	1295
10	2000	410.00	52	2–6	4–3	300,000	1439

For burning natural gas only.

Tank Capacity is based on temperature rise of 25° Fahr. per gallon per hour.

To establish steam rating in square feet, divide the total steam capacity in pounds by 0.25.

To establish water rating in square feet, divide hourly potential energy in B. T. U. by 150.

TRIMMINGS

Trimmings for Steam Boilers include Low Pressure Steam Gauge, Water Column, Water Gauge, Try Cocks, Safety Valve and Automatic Damper Regulator. No trimmings are furnished with Water Boilers.

GRATES

All Square Sectional Boilers are provided with shaking and dumping grates suitable for burning all grades of fuel. Pea Coal grate bars can be furnished with all square sectional boilers, when ordered.

TOOLS

Firing tools will be furnished with all boilers listed herein.

COIL OPENINGS

All boilers listed herein have openings provided for the introduction of a pipe coil in fire-box, for heating water for domestic use.

See Note, page 3.

Asbestos Cement Required to Cover Boilers 1½ Inches Thick

Number	Pounds	Number	Pounds
184	200	WN276	750
185	225	WN277	850
186	250	WN278	950
187	275	WN279	1050
225	275	WN280	1150
226	300	WN281	1250
227	325	WN282	1350
228	350	525B	220
255	425	625B	250
256	475	725B	280
257	525	825B	320
258	575	537B and 1537B	350
G276	350	637B and 1637B	430
G277	400	737B and 1737B	480
G278	450	837B and 1837B	550
G279	500	937B and 1937B	600
235	550	3	175
236	610	4	200
237	670	5	225
238	730	6	250
239	790	7	275
240	850	8	300
		9	325
		10	350

Amount of Asbestos Cement Required for Covering Capitol-Winchester Boilers 1½ Inches Thick

Steam Number	Water Number	Pounds	Steam Number	Water Number	Pounds
3130	4130	125	3440	4440	200
3140	4140	125	3450	4450	225
			3460	4460	225
3230	4230	150	3540	4540	250
3240	4240	150	3550	4550	275
			3560	4560	300
3330	4330	150	3640	4640	300
3340	4340	175	3650	4650	300
3350	4350	175	3660	4660	325

Sufficient cement for sealing the flues and for making the outside of the Boiler smoke and fire tight is furnished with all Capitol Boilers. Additional cement for covering the Boiler will be furnished at an extra charge, on special order.

Asbestos should be applied as follows: About twenty-four hours before using, mix with water to the consistency of thin mortar, enough asbestos for the first coat, which should be one-half of the entire thickness of the covering, and cover boiler, throwing on by handfuls with just enough force to make it stick without packing too solidly. The more loosely it is applied the more effective. When the first coat is thoroughly dry, apply the second coat in the same manner, having a thicker consistency. The third coat should be applied with a trowel and brought to a smooth finish. It is important for good results to allow each coat to thoroughly dry before applying the next. A canvas or heavy muslin jacket can now be pasted over the asbestos and made moisture-proof by painting with asphaltum. This will insure a permanent covering.

Asbestos is supplied in bags containing 50, 75 and 100 pounds each.

BOILERS for HOT WATER SUPPLY

Boilers for hot water supply are manufactured in sizes to supply tanks of the following capacities:

2X	60 gallons
119	90 gallons
120	150 gallons
62	200 gallons
63	250 gallons
G64	350 gallons

See booklet illustrating these Boilers.

TANK HEATING CAPACITY OF CAPITOL BOILERS

To determine the size of boiler necessary to heat a storage tank, multiply the number of U. S. gallons of water to be heated by the number of degrees the water is to be heated per hour and multiply this product by .0476. The result is the rating in square feet of proper size water boiler.

EXAMPLE:

It is desired to raise the temperature of 325 gallons of water 40 degrees per hour.

325 x 40 x .0476 = 619 sq. ft. of water boiler capacity.

A No. 4340 Capitol-Winchester is the nearest size boiler. These boilers will maintain the above rate for a period of eight hours.

NIPPLE CONNECTIONS

All United States Radiators are assembled with extra heavy malleable cast iron push nipples.

Threaded or screw nipple joints made up with rubber, asbestos, paper or composition washers are not used in any United States Radiators.

Push nipple connections do not need such washers or gaskets to make them tight—they are tapered iron-to-iron joints, permanently tight.

The same push nipple connections are used in all Capitol Boilers and United States Radiators.

Push nipple joints are easily taken apart and as easily put together again—a great advantage where long heavy radiators are handled on polished floors or elevated to upper stories.

TRITON PLAIN ONE-COLUMN RADIATORS

FOR STEAM AND WATER

Each section is 4½ inches wide. Width of legs, 5⅛ inches.

THIS pattern of One-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid, for steam and water, page 97.

Direct-indirect for steam or water, page 84.

Corner, curved and circular for steam and water, pages 94 and 95.

TRITON PLAIN ONE-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface				
		38 Inch Height 3 Square Feet per Section	32 Inch Height 2½ Square Feet per Section	26 Inch Height 2 Square Feet per Section	22 Inch Height 1⅔ Square Feet per Section	20 Inch Height 1½ Square Feet per Section
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½

Above radiators are tapped 2 inches and bushed as per list, page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiators.

See list prices, page 177.

Made at Dunkirk and Edwardsville Plants

TRITON PLAIN TWO-COLUMN RADIATORS

FOR STEAM AND WATER

Each section is 7⅛ inches wide. Width of legs, 7½ inches.

THIS pattern of Two-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid (excepting 45-inch height), for steam and water, page 97; Direct-Indirect, for steam and water, page 84; and Hospital pattern, page 82.

Corner, curved and circular, for steam and water. pages 94 and 95.

TRITON PLAIN TWO-COLUMN RADIATORS

LIST OF SIZES

No. of Sections	*Length Inches	Heating Surface						
		45 Inch Height 5 Sq. Feet per Sect'n	38 Inch Height 4 Sq. Feet per Sect'n	32 Inch Height 3⅛ Square Feet per Section	26 Inch Height 2⅝ Square Feet per Section	22 Inch Height 2¼ Square Feet per Section	20 Inch Height 2 Square Feet per Section	15 Inch Height 1½ Square Feet per Section
2	5	10	8	6⅔	5⅓	4½	4	3
3	7½	15	12	10	8	6¾	6	4½
4	10	20	16	13⅓	10⅔	9	8	6
5	12½	25	20	16⅔	13⅓	11¼	10	7½
6	15	30	24	20	16⅔	13½	12	9
7	17½	35	28	23⅓	18⅔	15¾	14	10½
8	20	40	32	26⅔	21	18	16	12
9	22½	45	36	30	24⅔	20¼	18	13½
10	25	50	40	33⅓	26	22½	20	15
11	27½	55	44	36⅔	29⅓	24¾	22	16½
12	30	60	48	40	32	27	24	18
13	32½	65	52	43⅓	34⅔	29¼	26	19½
14	35	70	56	46⅔	37⅓	31½	28	21
15	37½	75	60	50	40	33¾	30	22½
16	40	80	64	53⅓	42⅔	36	32	24
17	42½	85	68	56⅔	45⅓	38¼	34	25½
18	45	90	72	60	48	40½	36	27
19	47½	95	76	63⅓	50⅔	42¾	38	28½
20	50	100	80	66⅔	53⅓	45	40	30
21	52½	105	84	70	56	47¼	42	31½
22	55	110	88	73⅓	58⅔	49½	44	33
23	57½	115	92	76⅔	61⅓	51¾	46	34½
24	60	120	96	80	64	54	48	36
25	62½	125	100	83⅓	66⅔	56¼	50	37½

Above radiators tapped 2 inches and bushed, as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiators.

See list prices, page 177.

Made at Dunkirk and Edwardsville Plants

TRITON PLAIN THREE-COLUMN RADIATORS

FOR STEAM AND WATER

Each section is 9 inches wide Width of legs, 9 $\frac{5}{16}$ inches

THIS pattern of Three-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid (excepting 45-inch height), for steam and water, page 97; Direct-Indirect, for steam and water, page 84; Corner, curved and circular for steam, and water, pages 94 and 95.

TRITON PLAIN THREE-COLUMN RADIATORS

LIST OF SIZES

No. of Sections	*Length Inches	Heating Surface					
		45 Inch Height 6 Sq. Feet per Sect'n	38 Inch Height 5 Sq. Feet per Sect'n	32 Inch Height 4½ Square Feet per Section	26 Inch Height 3¾ Square Feet per Section	22 Inch Height 3 Square Feet per Section	18 Inch Height 2¼ Square Feet per Section
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼

Above radiators tapped 2 inches and bushed, as per list page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiators.

See list prices, page 177.

Made at Dunkirk and Edwardsville Plants

TRITON PLAIN FOUR-COLUMN RADIATORS

FOR STEAM OR WATER

Each section is 12½ inches wide. Width of legs, 12 13/16 inches.

THIS pattern of Four-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid (excepting 44-inch height), for steam and water, page 97; Direct-Indirect for steam and water page 84.

TRITON PLAIN FOUR-COLUMN RADIATORS

LIST OF SIZES

No. of Sections	*Length Inches	Heating Surface					
		44 Inch Height 10 Sq. Feet per Sect'n	38 Inch Height 8½ Square Feet per Section	32 Inch Height 7 Sq. Feet per Sect'n	26 Inch Height 5½ Square Feet per Section	22 Inch Height 4½ Square Feet per Section	18 Inch Height 3½ Square Feet per Section
2	6	20	17	14	11	9	7
3	9	30	25½	21	16½	13½	10½
4	12	40	34	28	22	18	14
5	15	50	42½	35	27½	22½	17½
6	18	60	51	42	33	27	21
7	21	70	59½	49	38½	31½	24½
8	24	80	68	56	44	36	28
9	27	90	76½	63	49½	40½	31½
10	30	100	85	70	55	45	35
11	33	110	93½	77	60½	49½	38½
12	36	120	102	84	66	54	42
13	39	130	110½	91	71½	58½	45½
14	42	140	119	98	77	63	49
15	45	150	127½	105	82½	67½	52½
16	48	160	136	112	88	72	56
17	51	170	144½	119	93½	76½	59½
18	54	180	153	126	99	81	63
19	57	190	161½	133	104½	85½	66½
20	60	200	170	140	110	90	70
21	63	210	178½	147	115½	94½	73½
22	66	220	187	154	121	99	77
23	69	230	195½	161	126½	103½	80½
24	72	240	204	168	132	108	84
25	75	250	212½	175	137½	112½	87½

Above radiators are tapped 2 inches and bushed, as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiators.

See list prices, page 177.

Made at Dunkirk and Edwardsville Plants

TRITON FIVE-COLUMN WINDOW RADIATOR

FOR STEAM OR WATER

Each section is 13 inches wide. Width of legs, 13 inches.

THIS pattern of Five-Column Radiators is also made in the following special form only: Legs extra high, solid, for steam and water, page 97; corner and curved for steam and water, page 94.

TRITON FIVE-COLUMN WINDOW RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface		
		20 Inch Height 5½ Square Feet per Section	17 Inch Height 4¾ Square Feet per Section	14 Inch Height 4 Square Feet per Section
2	6	11	9½	8
3	9	16½	14¼	12
4	12	22	19	16
5	15	27½	23¾	20
6	18	33	28½	24
7	21	38½	33¼	28
8	24	44	38	32
9	27	49½	42¾	36
10	30	55	47½	40
11	33	60½	52¼	44
12	36	66	57	48
13	39	71½	61¾	52
14	42	77	66½	56
15	45	82½	71¼	60
16	48	88	76	64
17	51	93½	80¾	68
18	54	99	85½	72
19	57	104½	90¼	76
20	60	110	95	80
21	63	115½	99¾	84
22	66	121	104½	88
23	69	126½	109¼	92
24	72	132	114	96
25	75	137½	118¾	100

Above radiators are tapped 2 inches and bushed, as per list on page 176

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiators.

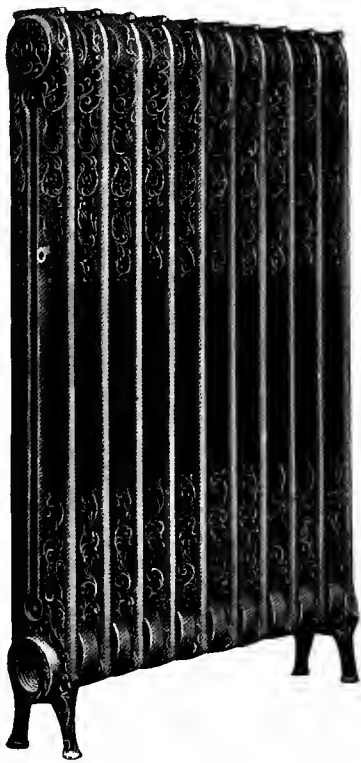
See list prices, page 177.

Made at Dunkirk and Edwardsville Plants

TRITON ONE-COLUMN RADIATORS

ORNAMENTAL

FOR STEAM AND WATER



Each section is 4½ inches wide. Width of Legs, 5¼ inches.

THIS pattern of One-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid, for steam and water, page 97.

TRITON ONE-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface				
		38 Inch Height 3 Square Feet per Section	32 In ch Height 2½ Square Feet per Section	26 Inch Height 2 Square Feet per Section	23 Inch Height 1⅔ Square Feet per Section	20 Inch Height 1½ Square Feet per Section
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½

Above radiators tapped 1½ inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiator.

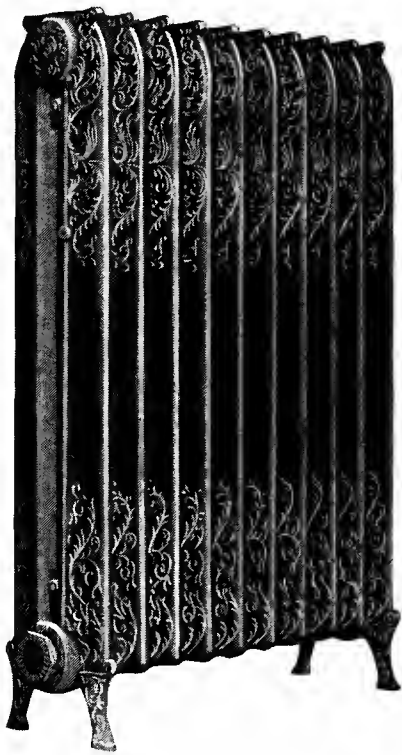
See list prices, page 177.

Made at Dunkirk Plant

TRITON TWO-COLUMN RADIATORS

ORNAMENTAL

FOR STEAM AND WATER



Each section is 7¼ inches wide. Width of legs, 8¼ inches.

THIS pattern of Two-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid (excepting 44-inch height), for steam and water, page 97.

TRITON TWO-COLUMN RADIATORS

LIST OF SIZES

Numb'r of Sections	*Length Inches	Heating Surface					
		44 In. Height 5 Sq. Ft per Section	38 In. Height 4 Sq. Ft per Section	32 Inch Height 3⅓ Square Feet per Section	26 Inch Height 2⅔ Square Feet per Section	23 Inch Height 2⅓ Square Feet per Section	20 In. Height 2 Sq. Ft per Section
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20
11	27½	55	44	36⅔	29⅓	25⅔	22
12	30	60	48	40	32	28	24
13	32½	65	52	43⅓	34⅔	30⅓	26
14	35	70	56	46⅔	37⅓	32⅔	28
15	37½	75	60	50	40	35	30
16	40	80	64	53⅓	42⅔	37⅓	32
17	42½	85	68	56⅔	45⅓	39⅔	34
18	45	90	72	60	48	42	36
19	47½	95	76	63⅓	50⅔	44⅓	38
20	50	100	80	66⅔	53⅓	46⅔	40
21	52½	105	84	70	56	49	42
22	55	110	88	73⅓	58⅔	51⅓	44
23	57½	115	92	76⅔	61⅓	53⅔	46
24	60	120	96	80	64	56	48
25	62½	125	100	83⅓	66⅔	58⅓	50

Above radiators tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiator.

See list prices, page 177.

Made at Dunkirk Plant

TRITON THREE-COLUMN RADIATORS

ORNAMENTAL

FOR STEAM AND WATER

Each section is 9 1/8 inches wide. Width of legs, 10 1/8 inches.

THIS pattern of Three-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid (excepting 44-inch height), for steam and water, page 97.

TRITON THREE-COLUMN RADIATORS

LIST OF SIZES

No. of Sections	*Leng'h Inches	Heating Surface						
		44 Inch Height 6 Sq. Feet per Sect'n	38 Inch Height 5 Sq. Feet per Sect'n	32 Inch Height 4½ Sq. Feet per Section	26 Inch Height 3¾ Sq. Feet per Section	23 Inch Height 3¼ Sq. Feet per Section	20 Inch Height 2¾ Sq. Feet per Section	18 Inch Height 2¼ Sq. Feet per Section
2	5	12	10	9	7½	6½	5½	4½
3	7½	18	15	13½	11¼	9¾	8¼	6¾
4	10	24	20	18	15	13	11	9
5	12½	30	25	22½	18¾	16¼	13¾	11¼
6	15	36	30	27	22½	19½	16½	13½
7	17½	42	35	31½	26¼	22¾	19¼	15¾
8	20	48	40	36	30	26	22	18
9	22½	54	45	40½	33¾	29¼	24¾	20¼
10	25	60	50	45	37½	32½	27½	22½
11	27½	66	55	49½	41¼	35¾	30¼	24¾
12	30	72	60	54	45	39	33	27
13	32½	78	65	58½	48¾	42¼	35¾	29¼
14	35	84	70	63	52½	45½	38½	31½
15	37½	90	75	67½	56¼	48¾	41¼	33¾
16	40	96	80	72	60	52	44	36
17	42½	102	85	76½	63¾	55¼	46¾	38¼
18	45	108	90	81	67½	58½	49½	40½
19	47½	114	95	85½	71¼	61¾	52¼	42¾
20	50	120	100	90	75	65	55	45
21	52½	126	105	94½	78¾	68¼	57¾	47¼
22	55	132	110	99	82½	71½	60½	49½
23	57½	138	115	103½	86¼	74¾	63¼	51¾
24	60	144	120	108	90	78	66	54
25	62½	150	125	112½	93¾	81¼	68¾	56¼

Above radiators tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiator.

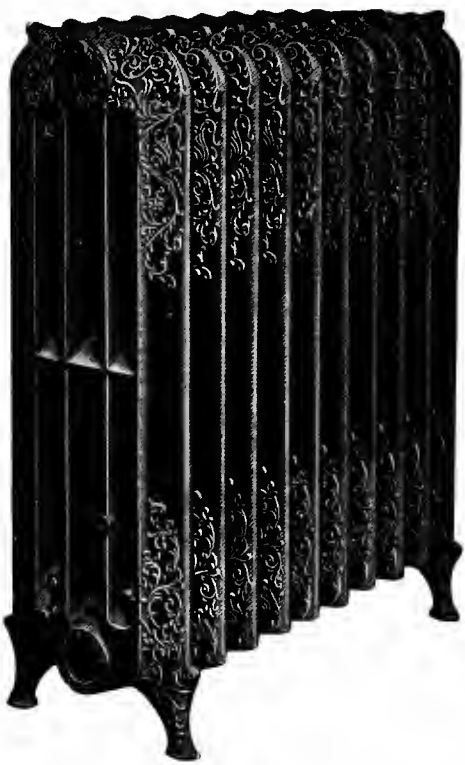
See list prices, page 177.

Made at Dunkirk Plant

TRITON FOUR-COLUMN RADIATORS

ORNAMENTAL

FOR STEAM OR WATER



Each section is 12¾ inches wide. Width of legs, 13¾ inches.

THIS pattern of Four-Column Radiators is also made in the following special form only: Legs extra high, solid (excepting 44-inch height), for steam and water, page 97.

TRITON FOUR-COLUMN RADIATORS

LIST OF SIZES

No. of Sections	*Leng'h Inches	Heating Surface						
		44 Inch Height 10 Sq. Feet per Sect'n	38 Inch Height 8½ Sq. Feet per Section	32 Inch Height 7 Sq. Feet per Sect'n	26 Inch Height 5½ Sq. Feet per Section	23 Inch Height 4½ Sq. Feet per Section	20 Inch Height 4 Sq. Feet per Section	18 Inch Height 3½ Sq. Feet per Section
2	6	20	17	14	11	9	8	7
3	9	30	25½	21	16½	13½	12	10½
4	12	40	34	28	22	18	16	14
5	15	50	42½	35	27½	22½	20	17½
6	18	60	51	42	33	27	24	21
7	21	70	59½	49	38½	31½	28	24½
8	24	80	68	56	44	36	32	28
9	27	90	76½	63	49½	40½	36	31½
10	30	100	85	70	55	45	40	35
11	33	110	93½	77	60½	49½	44	38½
12	36	120	102	84	66	54	48	42
13	39	130	110½	91	71½	58½	52	45½
14	42	140	119	98	77	63	56	49
15	45	150	127½	105	82½	67½	60	52½
16	48	160	136	112	88	72	64	56
17	51	170	144½	119	93½	76½	68	59½
18	54	180	153	126	99	81	72	63
19	57	190	161½	133	104½	85½	76	66½
20	60	200	170	140	110	90	80	70
21	63	210	178½	147	115½	94½	84	73½
22	66	220	187	154	121	99	88	77
23	69	230	195½	161	126½	103½	92	80½
24	72	240	204	168	132	108	96	84
25	75	250	212½	175	137½	112½	100	87½

Above radiators tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tappings, page 181.

*Allow ½ inch for each bushing in estimating length of radiator.

See list prices, page 177.

Made at Dunkirk Plant

FLORENTINE ONE-COLUMN RADIATORS

FOR STEAM AND WATER

Each Section is 4½ inches wide. Width of legs, 5½ inches.

THIS pattern of One-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96. Legs extra high, solid, for steam and water, page 97.

FLORENTINE ONE-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface				
		38 Inch Height 3 Square Feet per Section	32 Inch Height 2½ Square Feet per Section	26 Inch Height 2 Square Feet per Section	22 Inch Height 1⅔ Square Feet per Section	18 Inch Height 1½ Square Feet per Section
2	5	6	5	4	3⅓	2⅔
3	7½	9	7½	6	5	4
4	10	12	10	8	6⅔	5⅓
5	12½	15	12½	10	8⅓	6⅔
6	15	18	15	12	10	8
7	17½	21	17½	14	11⅔	9⅓
8	20	24	20	16	13⅓	10⅔
9	22½	27	22½	18	15	12
10	25	30	25	20	16⅔	13⅓
11	27½	33	27½	22	18⅓	14⅔
12	30	36	30	24	20	16
13	32½	39	32½	26	21⅔	17⅓
14	35	42	35	28	23⅓	18⅔
15	37½	45	37½	30	25	20
16	40	48	40	32	26⅔	21⅓
17	42½	51	42½	34	28⅓	22⅔
18	45	54	45	36	30	24
19	47½	57	47½	38	31⅔	25⅓
20	50	60	50	40	33⅓	26⅔
21	52½	63	52½	42	35	28
22	55	66	55	44	36⅔	29⅓
23	57½	69	57½	46	38⅓	30⅔
24	60	72	60	48	40	32
25	62½	75	62½	50	41⅔	33⅓

Above radiators tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiator.

See list prices, page 177.

Made at Edwardsville Plant

FLORENTINE TWO-COLUMN RADIATORS

FOR STEAM AND WATER

Each section is 7⅛ inches wide. Width of legs, 8⅛ inches.

THIS pattern of Two-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid (excepting 45-inch height), for steam and water, page 97; Direct-Indirect, for steam and water, page 86.

FLORENTINE TWO-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface					
		45 Inch Height 5 Sq. Feet per Section	38 Inch Height 4 Sq. Feet per Section	32 Inch Height 3⅓ Sq. Feet per Section	26 Inch Height 2⅔ Sq. Feet per Section	22 Inch Height 2¼ Sq. Feet per Section	18 Inch Height 1¾ Sq. Feet per Section
2	5	10	8	6⅔	5⅓	4½	3½
3	7½	15	12	10	8	6¾	5¼
4	10	20	16	13⅓	10⅔	9	7
5	12½	25	20	16⅔	13⅓	11¼	8¾
6	15	30	24	20	16	13½	10½
7	17½	35	28	23⅓	18⅔	15¾	12¼
8	20	40	32	26⅔	21⅓	18	14
9	22½	45	36	30	24	20¼	15¾
10	25	50	40	33⅓	26⅔	22½	17½
11	27½	55	44	36⅔	29⅓	24¾	19¼
12	30	60	48	40	32	27	21
13	32½	65	52	43⅓	34⅔	29¼	22¾
14	35	70	56	46⅔	37⅓	31½	24½
15	37½	75	60	50	40	33¾	26¼
16	40	80	64	53⅓	42⅔	36	28
17	42½	85	68	56⅔	45⅓	38¼	29¾
18	45	90	72	60	48	40½	31½
19	47½	95	76	63⅓	50⅔	42¾	33¼
20	50	100	80	66⅔	53⅓	45	35
21	52½	105	84	70	56	47¼	36¾
22	55	110	88	73⅓	58⅔	49½	38½
23	57½	115	92	76⅔	61⅓	51¾	40¼
24	60	120	96	80	64	54	42
25	62½	125	100	83⅓	66⅔	56¼	43¾

Above radiators are tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

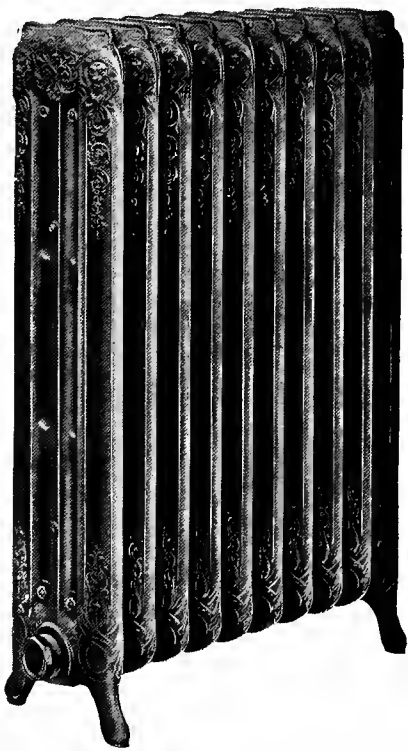
*Allow ½ inch for each bushing in estimating length of radiator.

See list prices, page 177.

Made at Edwardsville Plant

FLORENTINE THREE-COLUMN RADIATORS

FOR STEAM AND WATER



Each section is 9⅛ inches wide. Width of legs, 9⅞ inches

THIS pattern of Three-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid (excepting 44-inch height), for steam and water, page 97; Direct-Indirect, for steam and water, page 86.

FLORENTINE THREE-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface					
		44 Inch Height 6 Square Feet per Section	38 Inch Height 5 Square Feet per Section	32 Inch Height 4½ Sq. Feet per Section	26 Inch Height 3¾ Sq. Feet per Section	22 Inch Height 3 Square Feet per Section	18 Inch Heights 2¼ Sq. Feet per Section
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼

Above radiators are tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

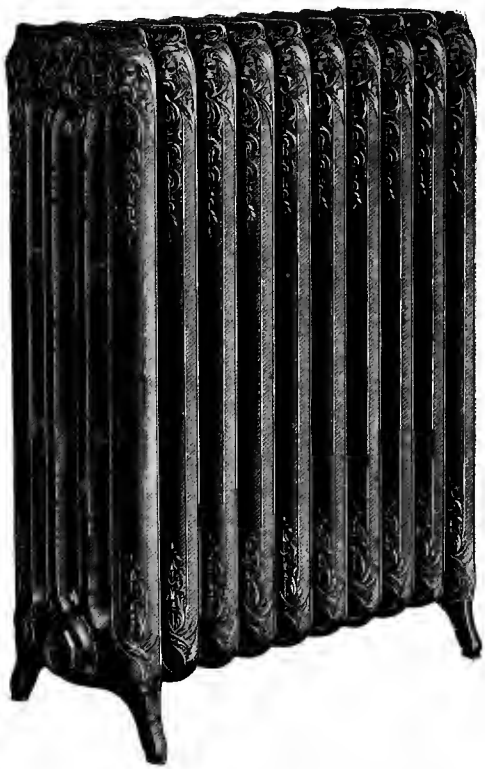
*Allow ½ inch for each bushing in estimating length of radiator.

See list prices, page 177.

Made at Edwardsville Plant

FLORENTINE FOUR-COLUMN RADIATORS

FOR STEAM OR WATER



Each section is 12½ inches wide. Width of legs, 13½ inches.

THIS pattern of Four-Column Radiators is also made in the following special forms only: Side Wall for Concealed Brackets, steam and water, page 96; Legs extra high, solid (excepting 44-inch height), for steam and water, page 97; Direct-Indirect, for steam and water, page 86.

FLORENTINE FOUR-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface					
		44 Inch Height 10 Square Feet per Section	38 Inch Height 8½ Sq. Feet per Section	32 Inch Height 7 Square Feet per Section	26 Inch Height 5½ Sq. Feet per Section	22 Inch Height 4½ Sq. Feet per Section	18 Inch Height 3½ Sq. Feet per Section
2	5½	20	17	14	11	9	7
3	8¼	30	25½	21	16½	13½	10½
4	11	40	34	28	22	18	14
5	13¾	50	42½	35	27½	22½	17½
6	16½	60	51	42	33	27	21
7	19¼	70	59½	49	38½	31½	24½
8	22	80	68	56	44	36	28
9	24¾	90	76½	63	49½	40½	31½
10	27½	100	85	70	55	45	35
11	30¼	110	93½	77	60½	49½	38½
12	33	120	102	84	66	54	42
13	35¾	130	110½	91	71½	58½	45½
14	38½	140	119	98	77	63	49
15	41¼	150	127½	105	82½	67½	52½
16	44	160	136	112	88	72	56
17	46¾	170	144½	119	93½	76½	59½
18	49½	180	153	126	99	81	63
19	52¼	190	161½	133	104½	85½	66½
20	55	200	170	140	110	90	70
21	57¾	210	178½	147	115½	94½	73½
22	60½	220	187	154	121	99	77
23	63¼	230	195½	161	126½	103½	80½
24	66	240	204	168	132	108	84
25	68¾	250	212½	175	137½	112½	87½

Above radiators are tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiator.

See list price, page 177.

Made at Edwardsville plant

GRECIAN ONE-COLUMN RADIATORS

FOR STEAM AND WATER

Each section is 4½ inches wide. Width of legs, 5 inches.

THIS pattern of One-Column Radiators is also made in the following special forms: Legs extra high, solid, for steam and water, page 97; Side Wall for Concealed Brackets, steam and water, page 96.

GRECIAN ONE-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface				
		38 Inch Height 3 Square Feet per Section	32 Inch Height 2½ Square Feet per Section	26 Inch Height 2 Square Feet per Section	23 Inch Height 1⅔ Square Feet per Section	20 Inch Height 1⅓ Square Feet per Section
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½

Above radiators are tapped 1½ inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

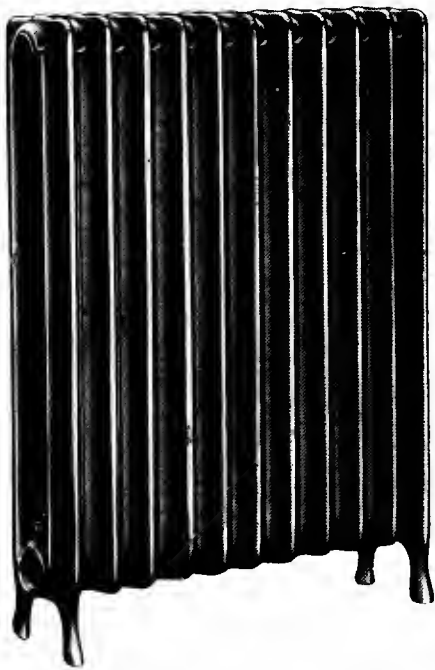
*Allow ½ inch for each bushing in estimating length of radiators.

See list prices, page 177.

Made at West Newton Plant

GRECIAN TWO-COLUMN RADIATORS

FOR STEAM AND WATER



Each section is 7¼ inches wide. Width of legs, 8¼ inches.

THIS pattern of Two-Column Radiators is also made in the following special forms only: Legs extra high, solid (excepting 45-inch height), for steam and water, page 97; Side Wall for Concealed Brackets, steam and water, page 96; Direct-Indirect, for steam and water, page 88.

GRECIAN TWO-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface					
		45 Inch Height 5 Sq. Feet per Section	38 Inch Height 4 Sq. Feet per Section	32 Inch Height 3⅓ Sq. Feet per Section	26 Inch Height 2⅔ Sq. Feet per Section	23 Inch Height 2⅓ Sq. Feet per Section	20 Inch Height 2 Sq. Feet per Section
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20
11	27½	55	44	36⅔	29⅓	25⅔	22
12	30	60	48	40	32	28	24
13	32½	65	52	43⅓	34⅔	30⅓	26
14	35	70	56	46⅔	37⅓	32⅔	28
15	37½	75	60	50	40	35	30
16	40	80	64	53⅓	42⅔	37⅓	32
17	42½	85	68	56⅔	45⅓	39⅔	34
18	45	90	72	60	48	42	36
19	47½	95	76	63⅓	50⅔	44⅓	38
20	50	100	80	66⅔	53⅓	46⅔	40
21	52½	105	84	70	56	49	42
22	55	110	88	73⅓	58⅔	51⅓	44
23	57½	115	92	76⅔	61⅓	53⅔	46
24	60	120	96	80	64	56	48
25	62½	125	100	83⅓	66⅔	58⅓	50

Above radiators are tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

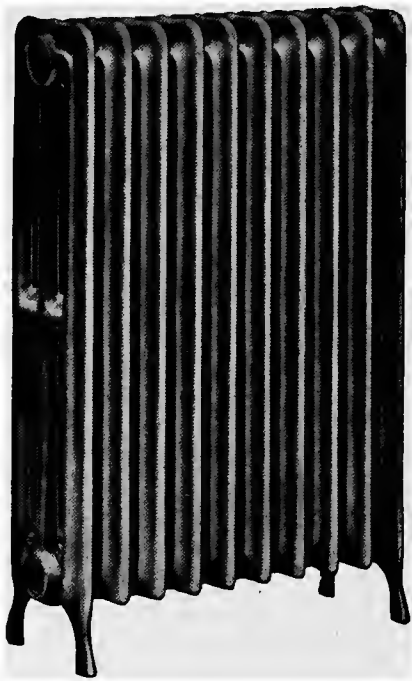
*Allow ½ inch for each bushing in estimating length of radiators.

See list prices, page 177.

Made at West Newton Plant

GRECIAN THREE-COLUMN RADIATORS

FOR STEAM AND WATER



Each section is 9 inches wide. Width of legs, 9¾ inches.

THIS pattern of Three-Column Radiators is also made in the following special forms only: Legs extra high, solid (excepting 45-inch height), for steam and water, page 97; Side Wall for Concealed Brackets, steam and water, page 96; Direct-Indirect, for steam and water, page 88.

GRECIAN THREE-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface					
		45 Inch Height 6 Sq. Feet per Section	38 Inch Height 5 Sq. Feet per Section	32 Inch Height 4½ Sq. Feet per Section	26 Inch Height 3¾ Sq. Feet per Section	23 Inch Height 3¼ Sq. Feet per Section	2 Inch Height 2¾ Sq. Feet per Section
2	5	12	10	9	7½	6½	5½
3	7½	18	15	13½	11¼	9¾	8¼
4	10	24	20	18	15	13	11
5	12½	30	25	22½	18¾	16¼	13¾
6	15	36	30	27	22½	19½	16½
7	17½	42	35	31½	26¼	22¾	19¼
8	20	48	40	36	30	26	22
9	22½	54	45	40½	33¾	29¼	24¾
10	25	60	50	45	37½	32½	27½
11	27½	66	55	49½	41¼	35¾	30¼
12	30	72	60	54	45	39	33
13	32½	78	65	58½	48¾	42¼	35¾
14	35	84	70	63	52½	45½	38½
15	37½	90	75	67½	56¼	48¾	41¼
16	40	96	80	72	60	52	44
17	42½	102	85	76½	63¾	55¼	46¾
18	45	108	90	81	67½	58½	49½
19	47½	114	95	85½	71¼	61¾	52¼
20	50	120	100	90	75	65	55
21	52½	126	105	94½	78¾	68¼	57¾
22	55	132	110	99	82½	71½	60½
23	57½	138	115	103½	86¼	74¾	63¼
24	60	144	120	108	90	78	66
25	62½	150	125	112½	93¾	81¼	68¾

Above radiators tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiators.

See list prices, page 177.

Made at West Newton Plant

GRECIAN FOUR-COLUMN RADIATORS

FOR STEAM OR WATER

Each section is 11 inches wide. Width of legs, 11¾ inches.

THIS pattern of Four-Column Radiators is also made in the following special forms only: Legs extra high, solid (excepting 45-inch height), for steam and water, page 97; Side Wall for Concealed Brackets, steam and water, page 88.

GRECIAN FOUR-COLUMN RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface					
		45 Inch Height 10 Sq. Feet per Section	38 Inch Height 8 Sq. Feet per Section	32 Inch Height 6½ Sq. Feet per Section	26 Inch Height 5 Sq. Feet per Section	23 Inch Height 4¼ Sq. Feet per Section	20 Inch Height 3½ Sq. Feet per Section
2	6	20	16	13	10	8½	7
3	9	30	24	19½	15	12¾	10½
4	12	40	32	26	20	17	14
5	15	50	40	32½	25	21¼	17½
6	18	60	48	39	30	25½	21
7	21	70	56	45½	35	29¾	24½
8	24	80	64	52	40	34	28
9	27	90	72	58½	45	38¼	31½
10	30	100	80	65	50	42½	35
11	33	110	88	71½	55	46¾	38½
12	36	120	96	78	60	51	42
13	39	130	104	84½	65	55¼	45½
14	42	140	112	91	70	59½	49
15	45	150	120	97½	75	63¾	52½
16	48	160	128	104	80	68	56
17	51	170	136	110½	85	72¼	59½
18	54	180	144	117	90	76½	63
19	57	190	152	123½	95	80¾	66½
20	60	200	160	130	100	85	70
21	63	210	168	136½	105	89¼	73½
22	66	220	176	143	110	93½	77
23	69	230	184	149½	115	97¾	80½
24	72	240	192	156	120	102	84
25	75	250	200	162½	125	106¼	87½

Above radiators are tapped 2 inches and bushed as per list on page 176

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiators.

See list prices, page 177.

Made at West Newton Plant

TRITON FLUE RADIATORS

ORNAMENTAL

FOR STEAM OR WATER

Each section is 9⅛ inches wide. Width of legs, 9⅛ inches.

THIS pattern of Triton Flue Radiators is also made in the following special form only: Direct-Indirect, for steam or water, page 90.

TRITON FLUE RADIATORS

LIST OF SIZES

Number of Sections	*Length Inches	Heating Surface			
		38 Inch Height 7 Square Feet per Section	32 Inch Height 5¾ Square Feet per Section	26 Inch Height 4½ Square Feet per Section	20 Inch Height 3¼ Square Feet per Section
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½
11	33	77	63¼	49½	35¾
12	36	84	69	54	39
13	39	91	74¾	58½	42¼
14	42	98	80½	63	45½
15	45	105	86¼	67½	48¾
16	48	112	92	72	52
17	51	119	97¾	76½	55¼
18	54	126	103½	81	58½
19	57	133	109¼	85½	61¾
20	60	140	115	90	65
21	63	147	120¾	94½	68¼
22	66	154	126½	99	71½
23	69	161	132¼	103½	74¾
24	72	168	138	108	78
25	75	175	143¾	112½	81¼

Above radiators tapped 2 inches and bushed as per list on page 176.

Distance from floor to center of tapping, see page 181.

*Allow ½ inch for each bushing in estimating length of radiator.

See list prices, page 177

Made at Dunkirk Plant

TRITON PLAIN TWO-COLUMN HOSPITAL RADIATORS

FOR STEAM OR WATER

Each section is 7⅛ inches wide. Width of legs, 7¼ inches.
Sections 3 inches on centers. Made in no special forms.

A RADIATOR specially designed for hospitals The extra large spacings between sections allow easy cleaning.

TRITON PLAIN TWO-COLUMN HOSPITAL RADIATORS

LIST OF SIZES

No. of Sections	*L'gth Inches	Heating Surface					
		45 Inch Height 5 Square Feet per Section	38 Inch Height 4 Square Feet per Section	32 Inch Height 3⅓ Square Feet per Section	26 Inch Height 2⅔ Square Feet per Section	22 Inch Height 2¼ Sq're Feet per Section	20 Inch Height 2 Square Feet per Section
2	6	10	8	6⅔	5⅓	4½	4
3	9	15	12	10	8	6¾	6
4	12	20	16	13⅓	10⅔	9	8
5	15	25	20	16⅔	13⅓	11¼	10
6	18	30	24	20	16	13½	12
7	21	35	28	23⅓	18⅔	15¾	14
8	24	40	32	26⅔	21⅓	18	16
9	27	45	36	30	24	20¼	18
10	30	50	40	33⅓	26⅔	22½	20
11	33	55	44	36⅔	29⅓	24¾	22
12	36	60	48	40	32	27	24
13	39	65	52	43⅓	34⅔	29¼	26
14	42	70	56	46⅔	37⅓	31½	28
15	45	75	60	50	40	33¾	30
16	48	80	64	53⅓	42⅔	36	32
17	51	85	68	56⅔	45⅓	38¼	34
18	54	90	72	60	48	40½	36
19	57	95	76	63⅓	50⅔	42¾	38
20	60	100	80	66⅔	53⅓	45	40
21	63	105	84	70	56	47¼	42
22	66	110	88	73⅓	58⅔	49½	44
23	69	115	92	76⅔	61⅓	51¾	46
24	72	120	96	80	64	54	48
25	75	125	100	83⅓	66⅔	56¼	50

Above radiators tapped two inches and bushed as per list on page 176.
Distance from floor to center of tapping, page 181.
*Allow ½ inch for each bushing in estimating length of radiator.
See list prices, page 177.

Made at Dunkirk and Edwardsville Plants

TRITON PLAIN
DIRECT-INDIRECT RADIATORS

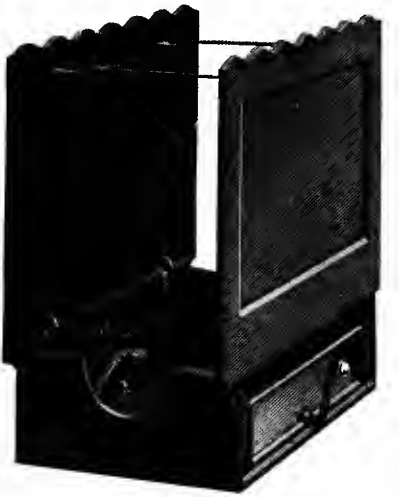
FOR STEAM OR WATER

Triton Plain Radiator with box base applied

TRITON Plain Box Bases made for one, two, three and four Column Triton Plain Radiators. With bottom inlet, separate floor dampers are not required.

DIRECT-INDIRECT BOX BASE

FOR TRITON RADIATORS



BACK OPENING

No. of Section	1-Col.	2-Col.	3-Col.	4-Col.
5	2 3/16 x 5 3/16	2 11/16 x 5 3/16	2 11/16 x 5 3/16	3 3/16 x 6 3/16
6	2 3/16 x 7 11/16	2 11/16 x 7 11/16	2 11/16 x 7 11/16	3 3/16 x 9 5/16
7	2 3/16 x 10 3/16	2 11/16 x 10 3/16	2 11/16 x 10 3/16	3 3/16 x 12 5/16
8	2 3/16 x 12 11/16	2 11/16 x 12 11/16	2 11/16 x 12 11/16	3 3/16 x 15 5/16
9	2 3/16 x 15 3/16	2 11/16 x 15 3/16	2 11/16 x 15 3/16	3 3/16 x 18 11/16
10	2 3/16 x 17 11/16	2 11/16 x 17 11/16	2 11/16 x 17 11/16	3 3/16 x 21 11/16
11	2 3/16 x 20 3/16	2 11/16 x 20 3/16	2 11/16 x 20 3/16	3 3/16 x 24 11/16
12	2 3/16 x 22 11/16	2 11/16 x 22 11/16	2 11/16 x 22 11/16	3 3/16 x 27 3/4
13	2 3/16 x 25 3/16	2 11/16 x 25 3/16	2 11/16 x 25 3/16	3 3/16 x 30 11/16
14	2 3/16 x 27 11/16	2 11/16 x 27 11/16	2 11/16 x 27 11/16	3 3/16 x 33 11/16
15	2 3/16 x 30 3/16	2 11/16 x 30 3/16	2 11/16 x 30 3/16	3 3/16 x 36 11/16

MAXIMUM BOTTOM OPENING

No. of Section	1-Col.	2-Col.	3-Col.	4-Col.
5	3½ x 5½	6⅛ x 5½	8 x 5½	11½ x 7
6	3½ x 8	6⅛ x 8	8 x 8	11½ x 10
7	3½ x 10½	6⅛ x 10½	8 x 10½	11½ x 13
8	3½ x 13	6⅛ x 13	8 x 13	11½ x 16
9	3½ x 15½	6⅛ x 15½	8 x 15½	11½ x 19
10	3½ x 18	6⅛ x 18	8 x 18	11½ x 22
11	3½ x 20½	6⅛ x 20½	8 x 20½	11½ x 25
12	3½ x 23	6⅛ x 23	8 x 23	11½ x 28
13	3½ x 25½	6⅛ x 25½	8 x 25½	11½ x 31
14	3½ x 28	6⅛ x 28	8 x 28	11½ x 34
15	3½ x 30½	6⅛ x 30½	8 x 30½	11½ x 37

FLORENTINE DIRECT-INDIRECT RADIATORS

FOR STEAM OR WATER

Florentine Radiator with box base applied

CAPITOL Box Bases made for use on Two, Three and Four-Column Florentine Radiators.

DIRECT-INDIRECT BOX BASE

FOR FLORENTINE RADIATORS

THE damper arrangements operates both front and back dampers with one lever, adjusting to atmospheric conditions by controlling the intake of cold air as desired.

Above Box Base is manufactured for use on Two, Three and Four-Column Florentine Radiators. Bottom of back air inlet one-half inch above the floor.

MEASUREMENTS OF BOX BASES

OUTSIDE MEASUREMENTS OF FLANGE FOR ATTACHING PIPE CONNECTION

No.	Description	Two and Three Column	Four Column
7	For seven-section radiator	$2\frac{3}{8}$ x $10\frac{1}{4}$	$2\frac{5}{16}$ x $11\frac{1}{8}$
8	For eight-section radiator	$2\frac{3}{8}$ x $12\frac{3}{4}$	$2\frac{5}{16}$ x $13\frac{7}{8}$
9	For nine-section radiator	$2\frac{3}{8}$ x $15\frac{1}{4}$	$2\frac{5}{16}$ x $16\frac{5}{8}$
10	For ten-section radiator	$2\frac{3}{8}$ x $17\frac{3}{4}$	$2\frac{5}{16}$ x $19\frac{7}{16}$
11	For eleven-section radiator	$2\frac{3}{8}$ x $20\frac{1}{4}$	$2\frac{5}{16}$ x $22\frac{1}{8}$
12	For twelve-section radiator	$2\frac{3}{8}$ x $22\frac{3}{4}$	$2\frac{5}{16}$ x $24\frac{7}{8}$

All orders for Box Base Radiators should clearly state whether back or bottom air inlet is required. Back opening will be furnished unless otherwise ordered.

An eleven-section Base is used on eleven or more odd number of sections, and a twelve-section base is used on twelve or more even number of sections.

For wall box, see page 92.

GRECIAN DIRECT-INDIRECT RADIATORS

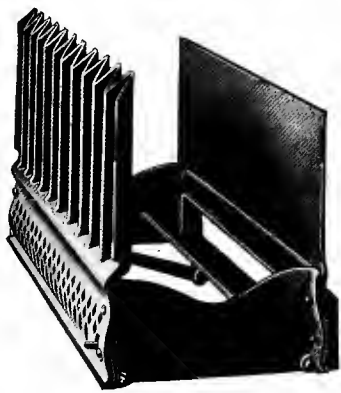
FOR STEAM OR WATER

Grecian Radiator with box base applied

GRECIAN Box Bases are made for use on Grecian Two-, Three- and Four-Column Radiators.

DIRECT-INDIRECT BOX BASE

FOR GRECIAN RADIATORS



OUTSIDE DIMENSIONS OF BACK OPENING FLANGE

Number of Sections	Size, Inches	Number of Sections	Size, Inches
5	3¼ x 8½	9	3¼ x 16½
6	3¼ x 8½	10	3¼ x 17½
7	3¼ x 12½	11	3¼ x 17½
8	3¼ x 12½	12 to 17	3¼ x 21¾

Bottom of each back air inlet opening is 1 inch above floor.

An eleven-section Base is used on eleven or more odd numbers of sections and a twelve-section Base is used on twelve or more even numbers of sections.

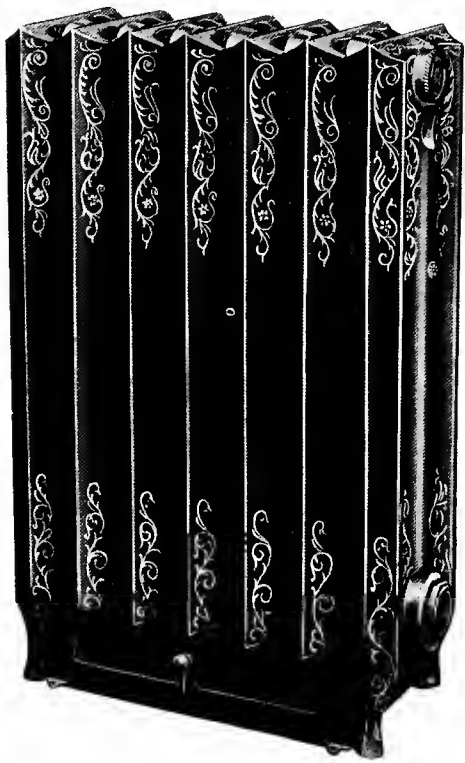
Box Bases with back or bottom air inlet can be furnished, but unless otherwise ordered, Base with back air inlet will be shipped. If bottom air iolet is required state whether floor dampers are wanted.

For Wall Box, see page 92.

TRITON FLUE RADIATORS

DIRECT-INDIRECT

FOR STEAM AND WATER



Made in no special forms.

TRITON FLUE BOX BASE

Bottom of back air inlet is 1 inch above floor.
For application to radiator, see page 90.

MEASUREMENTS OF TRITON FLUE BOX BASES

Outside of Back Opening Flange

Number of Sections	Size Inches	Number of Sections	Size Inches
4	2¾x 3½	9	2¾x18½
5	2¾x 6½	10	2¾x21½
6	2¾x 9½	11	2¾x24½
7	2¾x12½	12	2¾x27½
8	2¾x15⅝		

An eleven-section Base is used on eleven or more odd numbers of sections and a twelve-section Base is used on twelve or more even numbers of sections.

The damper arrangement of this is such that when cold air is brought through the floor, separate floor dampers are not required. Make floor opening same size as for wall opening.

For measurements, see above table.

WALL BOXES

THE main part of Box is constructed in one piece, which with angle slats in place, makes it water-tight and durable. A heavy copper screen is firmly held in position at back of box, making it insect-proof.

CROSS SECTION

From front flange to back of box, 2½ inches; size of opening in brickwork, 17¼ x 5⅛ inches; size of collar for galvanized iron, 17 x 4⅞ inches.

DINING-ROOM RADIATORS

FOR STEAM AND WATER

Number	*Length in Inches	Heating Surface Square Feet	Price for Water	Price for Steam
1	32½	43	$50.00	$46.00
2	37½	53	55.00	50.00
3	42½	63	60.00	54.00
4	47½	73	65.00	58.00
5	52½	83	70.00	62.00
6	57½	93	75.00	66.00
7	62½	103	80.00	70.00
8	67½	113	85.00	74.00
9	72½	123	90.00	78.00
10	77½	133	95.00	82.00

Made in Triton Plain Three-Column pattern only. See page 51. Ovens are all the same size, inside dimensions, 27 x 13¼ x 15½ inches. Height of radiator complete 38¼ inches.

Distance from back of oven to center of radiator tappings is 7 inches.

*Allow ½ inch for each bushing in estimating length of radiator.

CORNER RADIATORS

FOR STEAM AND WATER

Made in regular heights of Triton Plain Radiators.

In ordering Corner Radiators, always state which is the feed end as you face the radiator when in position, as illustrated above.

See page 182.

NEW TRITON CIRCULAR RADIATORS

Dimensions in Inches

No. of Sections in Stack	1 Column		2 Column		3 Column	
	Inside Diam. at Legs	Outside Diam. at Legs	Inside Diam. at Legs	Outside Diam. at Legs	Inside Diam. at Legs	Outside Diam. at Legs
12	8 1/8	18 1/2	6	20 7/8	4 1/8	22 3/4
14	9 3/4	19 7/8	7 3/8	22 1/4	5 1/2	24 1/8
16	11 1/8	21 1/4	8 3/4	23 5/8	6 7/8	25 1/2
18	12 1/2	22 5/8	10 1/8	25	8 1/4	26 7/8
20	14 1/8	24 1/8	11 3/4	26 1/2	9 3/4	28 1/2
22	15 1/2	25 1/2	13 1/8	27 7/8	11 1/8	29 7/8
24	17 1/8	27 1/4	15	29 3/4	13	31 3/4
26	18 1/4	28 1/4	15 7/8	30 5/8	13 7/8	32 5/8
28	19 7/8	30	17 1/2	32 5/8	15 5/8	34 1/4
30	21	31 1/8	19 5/8	33 1/2	16 3/4	35 3/8
32	22 5/8	32 3/4	20 1/4	35 1/8	18 5/8	37
34	23 7/8	33 7/8	21 1/2	36 1/4	19 1/2	38 1/4
36	25 3/8	35 3/8	23	37 3/4	21	39 3/4
38	26 5/8	36 5/8	24 1/4	39	22 1/4	41
40	28	38 1/8	25 5/8	40 1/2	23 3/4	42 3/8
42	29 3/8	39 1/2	27	41 7/8	25 1/8	43 3/4
44	30 7/8	41	28 1/2	43 3/8	26 5/8	45 1/4
46	32 1/2	42 5/8	30 1/8	45	28 1/4	46 7/8
48	34 1/8	44 3/8	32	46 3/4	30	48 3/4
50	34 7/8	45	32 1/2	47 3/8	30 5/8	49 1/4
52	36 1/8	46 1/4	33 3/4	48 5/8	31 7/8	50 1/2
54	38	48 1/8	35 5/8	50 1/2	33 3/4	52 3/8
56	39	49 1/8	36 5/8	51 1/2	34 3/4	53 3/8
58	41	51	39 5/8	53 5/8	36 5/8	55 5/8
60	42 3/4	52 3/4	40 3/8	55 1/8	38 3/8	57 1/8

Circular Radiators are made in two pieces and each half has one tapping for single pipe work or two tappings for two pipe work.

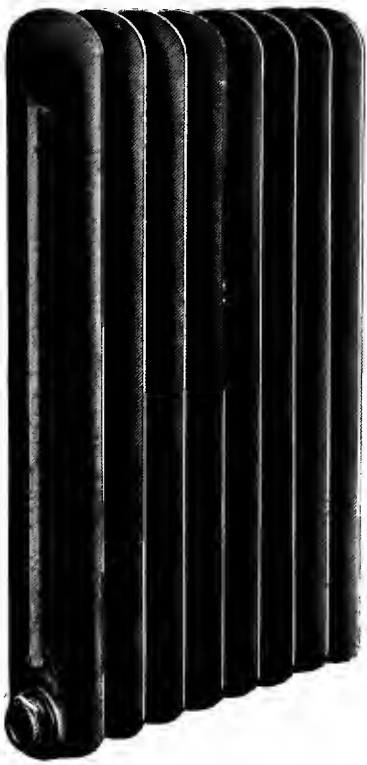
Marble Top can also be furnished if desired.

On Special Order, Circular Radiators for two-pipe steam or water when not to go *around column* can be furnished in one piece.

COLUMN WALL RADIATORS

With Concealed Brackets

FOR STEAM OR WATER

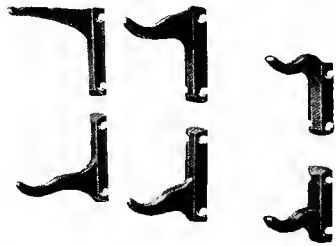


ABOVE illustration is representative of the Side Wall pattern of Florentine, Triton Plain and Puritan One, Two, Three and Four-Column; Triton, Ornamental One, Two and Three-Column, and Grecian One, Two, Three and Four-Column Radiators.

List of sizes, heights, tappings, etc., same as the several styles referred to above.

CONCEALED RADIATOR BRACKETS

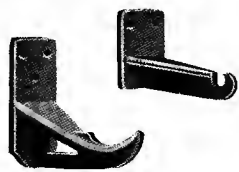
FOR TRITON ORNAMENTAL RADIATORS



Made to support One, Two and Three-Column Triton Ornamental Radiators.

FOR TRITON PLAIN, AND FLORENTINE RADIATORS

Made to support One, Two, Three and Four-Column Triton Plain, and Florentine Radiators.



FOR GRECIAN RADIATORS

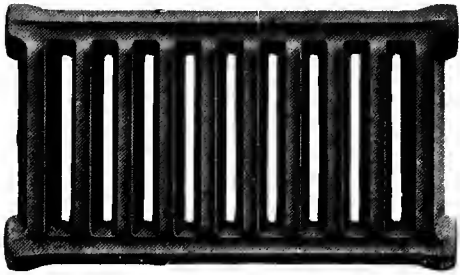
Made to support One, Two, Three and Four-Column Grecian Radiators.

HIGH LEGS

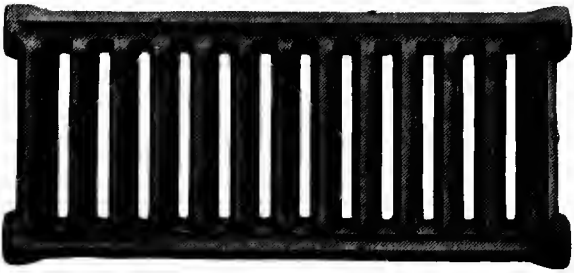
On Special Order only, all styles of our Radiators (except 44 and 45-inch heights) can be furnished with extra high solid legs, for which an extra charge will be made.

TRITON WALL RADIATORS

No. 5-A



No. 7-A

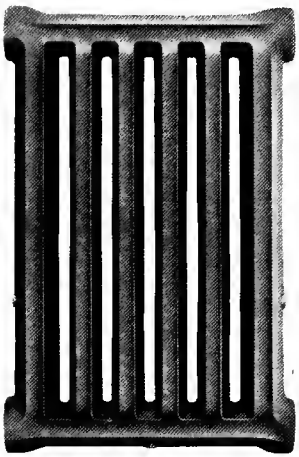


No. 9-A

Section Numbers	Height Inches	Length or Width Inches	Thickness Inches	Thickness With Brackets Inches	Heating Surface Sq. Ft.
5 A	14⅛	16½	3	3½	5
7 A	14⅛	22⅞	3	3½	7
9 A	14⅛	29¼	3	3½	9
7 B	22⅞	14⅛	3	3½	7
9 B	29¼	14⅛	3	3½	9

Manufactured at West Newton, Pa., plant.

TRITON WALL RADIATORS

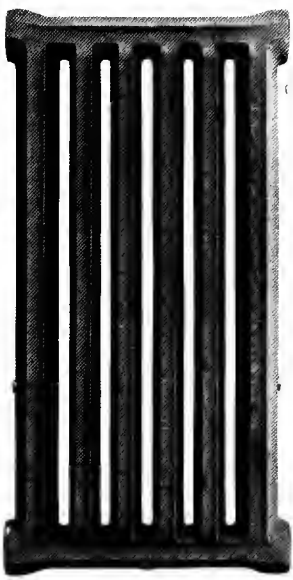


No. 7B

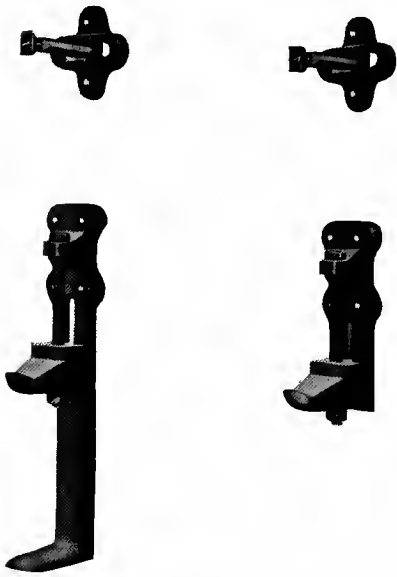
Triton Wall Radiators should always be assembled with bars vertical, whether sections are built in stacks or tiers. Nos. 5A, 7A and 9A are used when sections are to be assembled end to end, and Nos. 7B and 9B when assembled side by side.

For ratings and measurements see page 98.

For comparative efficiency tests and methods of assembling see pages 183 to 198.



No. 9 B.



L M

TRITON ADJUSTABLE WALL BRACKETS

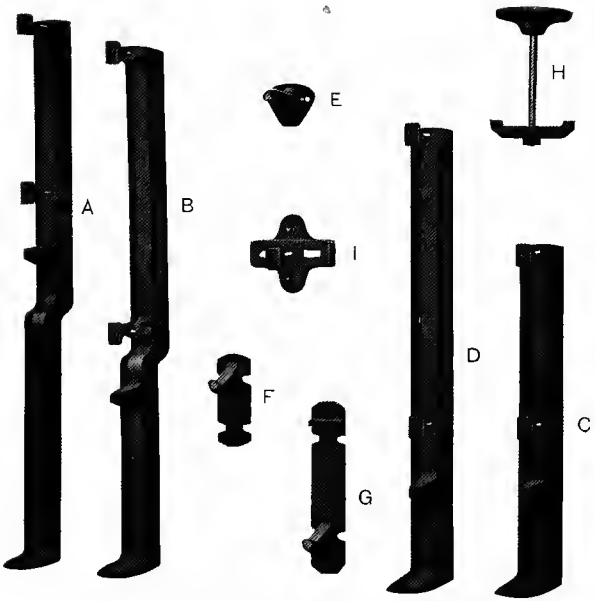
Made for supporting wall radiators in large or small tiers or stacks in buildings of any character where wall radiation is installed.

Brackets are made in two styles. "M" Brackets can be screwed to the wall to support any arrangement of wall radiation. Brackets "L" can rest on the floor or be imbedded in concrete floors in factories or other buildings where floors and walls are of concrete and attachment to walls is impossible.

Vertical movement of the seat of these brackets is 2", permitting adjustment for pitch after radiators are erected. The brackets set the outer face of the radiator 4⅞" from the wall.

	Distance from floor to center of tapping.	Can be adjusted to
No. L 1	5½ inches	7½ inches.
No. L 2	7½ inches	9½ inches.
No. L 3	9½ inches	11½ inches.

For additional measurements see page 179.



WALL RADIATORS BRACKETS

Brackets "B" to fit over a 9½ inch high baseboard for supporting wall radiators Nos. 7-B and 9-B.

Height from Floor to Center of Tapping

No. B 5½ from floor to center..... 5½"
No. B 7½ from floor to center..... 7½"
No. B 9½ from floor to center..... 9½"

Brackets "D" are straight right angle brackets without offset for supporting Nos. 7-B and 9-B. Distance from floor to center of tapping 5½ inches.

Brackets "A" to fit over baseboard for supporting Nos. 5A, 7A and 9A.

Height from Floor to Center of Tapping		
No. A 6 will fit over baseboard.....	1½"	6"
No. A 8 will fit over baseboard.....	3½"	8"
No. A 10 will fit over baseboard.....	5½"	10"
No. A 12 will fit over baseboard.....	7½"	12"
No. A 14 will fit over baseboard.....	9½"	14"
No. A 16 will fit over baseboard.....	11½"	16"

Brackets "C" are straight right angle brackets without offset for supporting Nos. 5A, 7A and 9A. Distance from floor to center of tapping 5½ inches.

Brackets "F", "G", "E" and "I" are screwed to wall, baseboard and wainscoting. "F" and "G" are bottom supports for all sizes; "E" and "I" top guides to hold radiator in place should always be used with "F" and "G" brackets. "F" and "G" brackets are slotted for four wood screws not furnished by us, and "E" and "I" are for two wood screws.

Ceiling brackets "H" for supporting radiator from ceilings, made of cast plate 3⅜ inches in diameter to be screwed to ceiling joist by four screws. Bolt furnished gives a distance of from 3½ to 5 inches from bottom of radiator to ceiling. Other lengths on special order.

With brackets "A", "B", "D" and "C" we furnish 2–1¼ stove bolts with button, and with bracket "I" 1–1¼ stove bolt with button.

PANTRY RADIATOR

FOR STEAM OR WATER

THIS pattern of radiator is useful for pantries, restaurants, dining-rooms and any place where heat is required, and the additional service of plate warming needed. It is made up from seven-foot sections only. All openings on lower shelf are tapped.

The radiator may be constructed from one to five sections high as follows:

Number	Height Inches	Heating Surface Feet	List Price
1	7	7	$ 8.00
2	17	15	15.00
3	27	23	22.00
4	37	31	29.00
5	47	39	36.00

Length, 24¼ inches. Width, 13¼ inches.

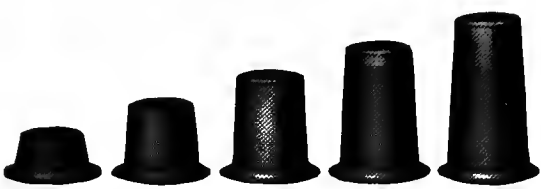
Tapping, see page 176.

ADJUSTABLE FEET

CONSIST of two iron blocks that open by turning the top piece which is so cast that any radiator foot will fit securely. Adjustment can be made with the screw, which holds the two pieces in place. They can be used on any kind of fixture that must stand level. Furnished in plain iron and can be bronzed to correspond to fixture upon them.

No. 1 extends ⅞ to 1¼ inches, price each	$0.20
No. 2 extends 1¼ to 1¾ inches, price each . .	.25
No. 3 extends 1⅜ to 2¼ inches, price each	.30

PEDESTALS



SOLID cast-iron pedestals can be furnished for placing under legs of all styles of our radiators and are made in the following heights:

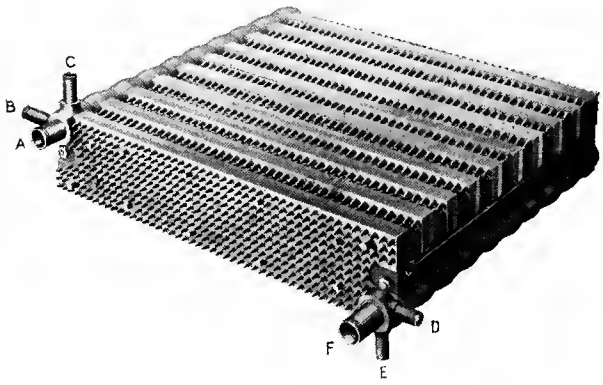
½, 1, 1½, 2, 2½, 3, 3½, 4 and 4½ inches

CAPITOL RADIATOR WRENCHES

MADE to fit all United States Radiator screw nipples, which have two lugs on inside so that flattenced end of wrench can be applied and the nipple unscrewed or tightened. Price each, $2.50.

PIN INDIRECT RADIATORS

FOR STEAM OR WATER



MEASUREMENTS

10 SQUARE FEET PER SECTION

Length of Section Inches	Depth of Section Inches	Depth Over All Inches	Center to Center Push Nipple Inches	Center to Center Screw Nipple *Inches
36¼	7¾	8⅝	3⅛	4⅛

Maximum tappings 1½″ at A and F, 1¼″ at B, C, D and E.

15 SQUARE FEET PER SECTION

Length of Section Inches	Depth of Section Inches	Depth Over All Inches	Center to Center Push Nipple Inches	Center to Center Screw Nipple *Inches
36⅝	10⅝	11⅝	3¼	4¼

*For free area between sections, see page 202.

Maximum tappings 2″ at A and F and 1¼″ at B, C, D and E.

PIN INDIRECT RADIATORS

FOR STEAM OR WATER

MEASUREMENTS

20 SQUARE FEET PER SECTION

Length of Section Inches	Depth of Section Inches	Depth Over All Inches	Center to Center of Section, Push Nipple, Inches	Center to Center of Section, Screw Nipple, *Inches
36	14	14¾	3¾	4¾

*For free area between sections, see page 202.
Maximum tappings 2½" at A and F, 2" at B, C, D and E.

INDIRECT RADIATORS

TAPPINGS on Indirect Radiators can be made at A, B, C, D, E, or F, but unless otherwise ordered they will be tapped at A and F, as follows:

Pin 10-foot section, 1½ inches; Pin 15 and 20-foot, 2 inches; bushed as desired.

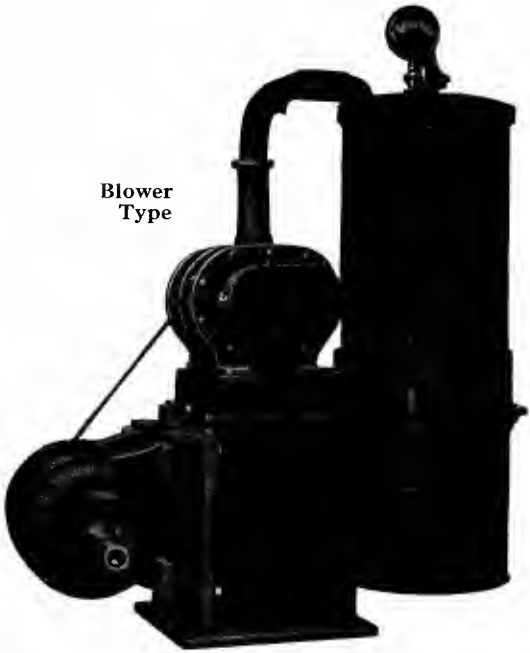
All Pin Indirect sections are regularly connected with extra heavy malleable iron push nipples but on special order extra heavy right and left hand screw nipples having hexagon nut at center can be furnished.

Radiator sections are assembled at factory and shipped complete, unless specially ordered otherwise. By assembling at factory the radiators can be thoroughly tested to prevent leaky joints and at the same time save much of Fitter's time in setting.

When specially ordered, sections are shipped unassembled with bolts and nipples for putting together, but when so ordering always specify the number of stacks and number of sections in each stack, that the proper bolts may be sent.

When ordered with screw nipples, distance center to center can be increased ¼ inch or ½ inch if desired.

An additional net charge of one cent per square foot is made for assembling at factory.



SINGLE SWEEPER PLANTS

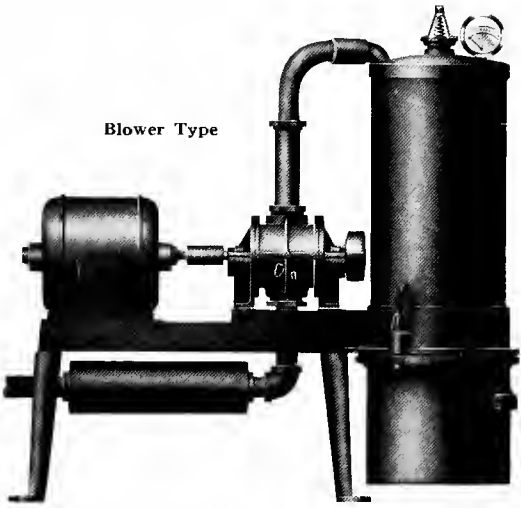
Plant No.	Motor H. P.	Current Available	Mercury Vacuum at Tank	Net Air Per Min. Cu.Ft.	Blower Displacement Cu.Ft.	K. W. Input	Equipment Furnished	Price
101	½	D. C. 110 or 220 Volt or A. C. 110-220 Volt 60 Cycle Single Ph.	3½	45	70	.6	A	$155.00
102	¾		4	50	80	.85	A	225.00
103	1		5	55	85	1.	B	300.00
104	1½		6	55	90	1.3	C	325.00
105	2		7	60	95	2.	C	350.00

Prices shown above are for either belt driven or direct connected machines, with the exception of Plant 101 (Bungalow), which is furnished in direct connected pattern only.

SPECIAL MOTORS

If alternating current motors are desired for frequencies other than 60 cycles they will be furnished at an additional net cost as follows (Belt drive only):

Plant No.	CYCLES					
	25	30	40	50	100	133
102	$14.00	$14.00	$ 8.00	$4.50	$10.00	$10.00
103	21.00	21.00	14.50	7.50	23.50	23.50
104	22.00	22.00	13.00	7.50	27.50	27.50
105	23.50	23.50	18.50	7.50	50.00	50.00



BUNGALOW CLEANER

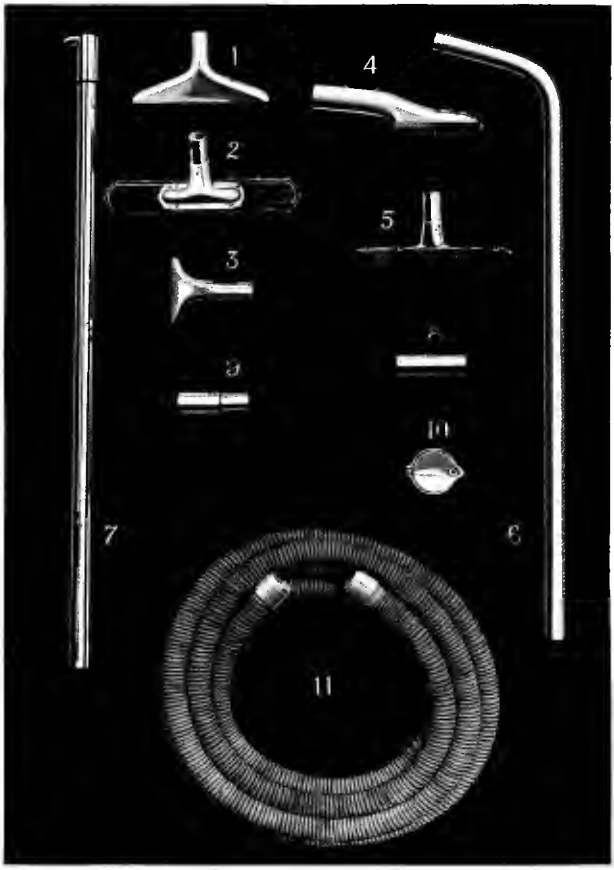
SINGLE SWEEPER PLANTS

Standard two-inch black iron pipe should be used for riser, horizontal main and exhaust piping. Pipe ends should be carefully butt-ended and reamed, long sweep fittings used where wall space will permit, and clean-cut plugs inserted at all exposed turns. In making basement drops for inlet valves, use 1½-inch pipe.

Plant Number	Weight Crated	Style Unit	DIMENSIONS			Vacuum in tool	No. Feet of Pipe to be used
			Width	Length	Height		
101-D	450 lbs.	Direct	14″	48″	40″	2½	50
102-D	575 lbs.	Direct	14″	48″	40″	2½	125
102-B	550 lbs.	Belt	20″	44″	40″	2½	125
103-D	650 lbs.	Direct	14″	48″	40″	3	200
103-B	625 lbs.	Belt	20″	44″	40″	3	200
104-D	675 lbs.	Direct	16″	48″	48″	3	275
104-B	650 lbs.	Belt	20″	44″	40″	3	275
105-D	700 lbs.	Direct	16″	48″	48″	3	300
105-B	675 lbs.	Belt	20″	44″	40″	3	300

To determine the number of feet of pipe: Add the height of the furthest riser to the length of horizontal main necessary to connect that riser to the machine. Capitol Cleaners are single sweeper plants, that is, but one tool can be operated at a time. In determining the proper size machine to use for a given installation, it is necessary to take into consideration only the longest run of piping that will be in operation, since the inlet valves on the balance of the system are closed and air and dirt can pass into the system only through the tool that is being operated.

If Plant 101 (Bungalow Cleaner) is desired equipped with an alternating current motor, and the frequencies are other than sixty cycle, say 25, 30 or 50, an additional net charge of $15.00 will be made.



The following prices apply on tools and parts ordered separately and are subject to change without notice.:

1. Carpet Renovator, 8"..... $3.00
   Carpet Renovator, 10"..... 3.25
   Carpet Renovator, 12"..... 3.50
2. Bare Floor Tool, 12"..... 5.50
   Bare Floor Tool, 14"..... 5.50
   Bare Floor Tool, 18"..... 9.00
3. Upholstery Tool, 4"..... 1.75
4. Hand Brush, 6"..... 3.50
5. Wall Brush, 6"..... 5.50
   Wall Brush, 12"..... 6.00
6. Floor Rod with swivel..... 6.50
7. Wall Rod..... 5.25
8. Hose Coupling..... $1.00
9. Valve Connector..... 1.00
10. Inlet valves, Male or Female, 1½" thread:
    Flush, Brass..... 1.50
    Flush, Nickle..... 1.60
11. Hose: 1½" inside Diameter, Wire Ribbed, Canvas Covered:
    10 Ft. Section..... 6.00
    15 Ft. Section..... 9.00
    25 Ft. Section..... 15.00
    50 Ft. Section..... 30.00

Standard equipments regularly furnished with each Plant.

SET "A"

Carpet Renovator, 8″
Bare Floor Sweeper, 12″
Upholstery Tool, 4″
Hand Brush, 6″

Floor Rod with Swivel
Inlet Valve Connector
Slip Joint Hose Connector
30 Ft. 1½″ Vacuum Hose

3 Inlet Valves.

SET "B"

Carpet Renovator, 10″
Bare Floor Sweeper, 14″
Upholstery Tool, 4″
Hand Brush, 6″
Wall Brush, 6″

Floor Rod with Swivel
Wall Rod
Inlet Valve Connector
Slip Joint Hose Connector
40 Ft. 1½″ Vacuum Hose

4 Inlet Valves.

SET "C"

Carpet Renovator, 12″
Bare Floor Sweeper, 18″
Upholstery Tool, 4″
Hand Brush, 6″
Wall Brush, 12″

Floor Rod with Swivel
Wall Rod
Inlet Valve Connector
Slip Joint Hose Connector
50 Ft. 1½″ Vacuum Hose

6 Inlet Valves.

CAPITOL PORTABLE UNITS

101-T—½ HP. Motor, Set "A" no valves, 25 ft. Hose..... $225.00
102-T—¾ HP. Motor, Set "A" no valves, 25 ft. Hose..... 250.00
103-T— 1 HP. Motor, Set "B" no valves, 25 ft. Hose..... 325.00

CAPITOL CLEANERS WITHOUT MOTORS

Plant 101, Equipment, Set "A"..... $125.00
Plant 102, Equipment, Set "A"..... 160.00
Plant 103, Equipment, Set "B"..... 250.00
Plant 104, Equipment, Set "C"..... 250.00
Plant 105, Equipment, Set "C"..... 275.00

INSTRUCTIONS FOR ORDERING VACUUM CLEANERS

Order Capitol Cleaners by number, stating whether belt driven or direct connected.

State whether current desired is Direct or Alternating.

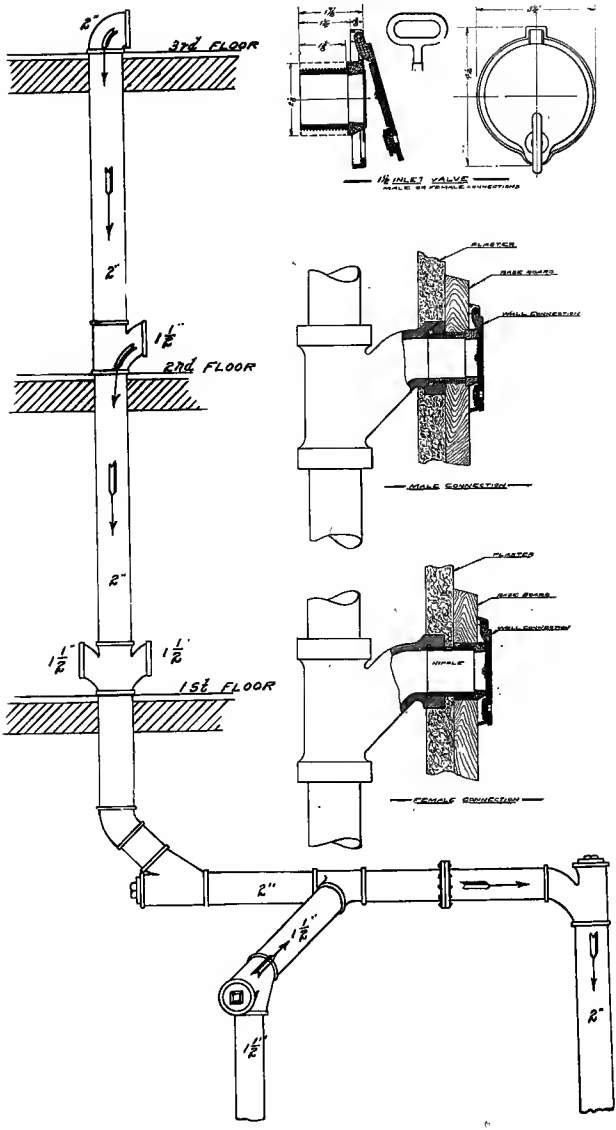
If Direct Current, give voltage.

If Alternating Current, give voltage, phase and cycles.

In ordering Inlet Valves specify finish and whether male or female thread.

Capitol Cleaners sold f. o. b. cars Factory.

Plants 101-2-3-4 and 5 are manufactured at Connersville, Ind.



Typical Piping Lay out

TRITON PACKLESS RADIATOR VALVES

FOR STEAM

THE Triton Packless Radiator Valve has a number of decided advantages over any other article of its class. Its packless and quick opening features are simple and efficient and the interior arrangement cannot be injured by ordinary abuse. The bonnet is carried up to the under side of the follower plate to protect the working parts from any outside interference.

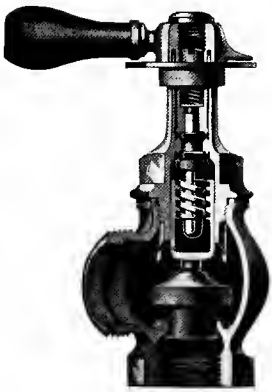
By referring to the sectional view, it will be seen that the stem is of the non-rising type and is provided with a flange a short distance above the triple thread. Between this flange and the inwardly extending flange of the bonnet is a specially prepared composition washer. Another similar washer is placed immediately above the inwardly extending flange of the bonnet, and upon this second composition washer rests a gland shaped follower plate extending from the handle. A shoulder is formed on the inside of this follower plate and this shoulder supports a spring which bears upward against a nut screwed to the top of the stem. A double service is performed by this spring, as it bears downward on the upper composition washer and at the same time pulls upward against the lower composition washer, thus holding both of them tightly against the inwardly extending flange of the bonnet and taking up automatically any wear that may occur in either. This insures an absolutely tight joint against water, steam or air. It has the genuine quick opening feature, as it can be fully opened or fully closed and locked closed by about a three-quarters turn of the handle.

WITH UNION, COMP. DISC, ROUGH BODY, PLATED ALL OVER

No.	Size, inches . . .	½	¾	1	1¼	1½	2
512	Angle	$3.15	$3.80	$4.75	$6.40	$8.10	$13.10

On special order can also be furnished with lever handle or lock and shield. Plated keys list, 50 cents each extra.

See page 180 for roughing-in measurements.



TRITON GRADUATED PACKLESS RADIATOR VALVES

THE Triton Graduated Packless Valve is similar in construction to the regular packless valve shown on page III, except that it has a lever handle, an indicator plate graduated into eight sections and means for a special adjustment by which each valve can be accurately set for a wide range of sizes of radiators.

With each valve we furnish four different shells, any one of which may be attached to the disc holder below the disc. If the valve is to be connected to a very small radiator, the shell with the single slot should be used, while if the radiator is of medium or large size, shells with two, three or four slots should be employed. It will remain partly open at any desired position without any danger of variation of the openings unless the handle is moved.

WITH UNION, COMP. DISC, ROUGH BODY, PLATED ALL OVER

*No.	Size, inches	½	¾	1	1¼	1½
522	Angle Valve, complete with Shells (per cut) . . .	$4.00	$4.80	$5.85	$7.65	$9.50
523	Angle Valve, without Shells.	3.75	4.50	5.50	7.25	9.00
622	Corner Valve, R. or L., complete witb Shells . . .	4.30	5.20	6.35	8.30	10.35
623	Corner Valve, R. or L., without Shells	4.05	4.90	6.00	7.90	9.85

On special order can be furnished with lock and shield. Plated keys, list 50 cents each extra. Unless otherwise specified valves with shells will be shipped.

TRITON VACUUM THERMO RADIATOR VALVES

THIS is a very sensitive and efficient return valve. It has a marked advantage over all other valves of its type; on account of its construction, the expansion member cannot become overheated. By reference to the sectional view it will be seen that the steam and water enter from below, and when the carbon post becomes sufficiently heated it closes the inlet and prevents any further heat from striking it, and at the same time permits the water of condensation to pass freely when open. It is automatic in its action and can be adjusted to operate at any desired degree of heat. In each case it responds almost instantly to a difference of a few degrees of temperature.

No. 10 Angle, is adapted to take care of 150 feet of radiation; list, $6.00.

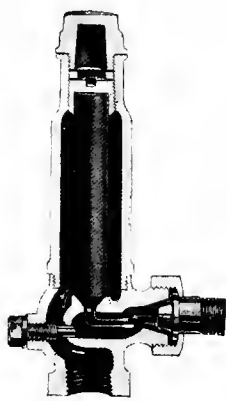
No. 12 Angle, is adapted to take care of 250 feet of radiation; list, $8.00.

No. 14 Angle, is adapted to take care of 400 feet of radiation; list, $10.00.

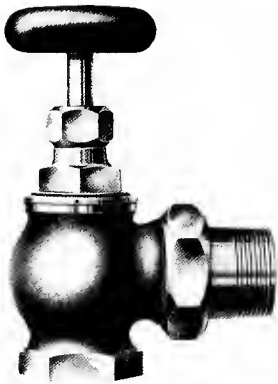
Tappings ½ inch for all sizes.

These valves can also be furnished in either corner or straightway pattern at an addition of $1.00 to the list price of the angle type.

With Union, Plated All Over.



STEAM RADIATOR VALVES



Nos. 112 and 412

Lock and Shield No. 312

WITH UNION, COMP. DISC—ANGLE

No.	Size, inches . . .	½	¾	1	1¼	1½	2
112	Rough body, plated all over	$3.15	$3.80	$4.75	$6.40	$8.10	$13.10

WITH UNION, COMP. DISC—ANGLE. Lock and Shield

No.	Size, inches .	½	¾	1	1¼	1½	2
312	Rough body, plated all over	$3.15	$3.80	$4.75	$6.40	$8.10	$13.10

Plated keys, list, 50 cents each extra.

WITH UNION *BRASS DISC—ANGLE

No.	Size, inches	½	¾	1	1¼	1½	2
412	Rough body, plated all over	$2.40	$2.85	$3.65	$5.05	$7.10	$10.85

*When required for hot water heating, a hole for circulation will be drilled through the brass disc. Specify clearly when wanted for water.

For convenience when ordering, use numbers and sizes only.

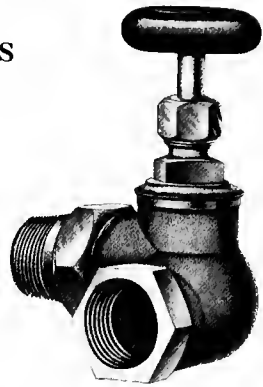
See page 180 for roughing-in measurements.

CORNER RADIATOR VALVES

FOR STEAM

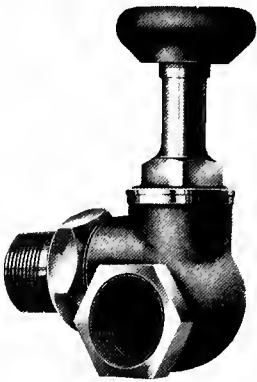
THESE corner valves, with a large area in the body, show a great improvement over the old style.

All steam metal, Comp. Disc, with Union.



No. 212L

No.	Rough Body, Plated All Over	Size, Inches					
		½	¾	1	1¼	1½	2
*212R	Right hand	$3.45	$4.20	$5.25	$7.05	$8.95	$14.45
*212L	Left hand . .	3.45	4.20	5.25	7.05	8.95	14.45



No. 612L

TRITON PACKLESS CORNER RADIATOR VALVES

FOR STEAM

THESE valves are of the same construction as the Packless Valves shown on page 111. Comp. Disc with Union.

No.	Rough Body Plated All Over	Size, Inches					
		½	¾	1	1¼	1½	2
*612R	Right hand . .	$3 45	$4.20	$5.25	$7.05	$8.95	$14.45
*612L	Left hand . .	3.45	4.20	5.25	7.05	8.95	14.45

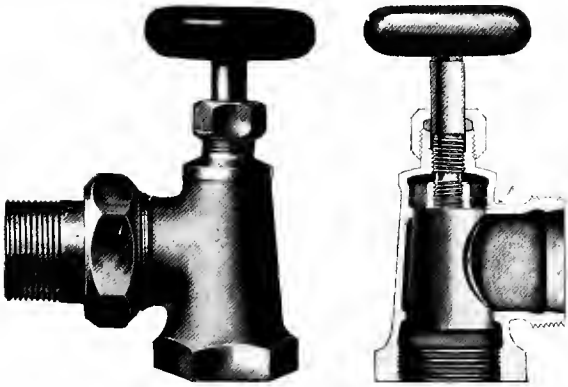
*On special order, can also be furnished with lock and shield. Plated keys, list 50 cents each extra.

Triton Packless Corner Valves are made in the graduated pattern with lever handle or lock and shield. See page 112 for list.

For convenience when ordering use numbers and sizes only.

See page 180 for roughing-in measurements.

BELL-SHAPED WATER RADIATOR VALVES



QUICK OPENING—BONNETLESS

THE Bell-Shaped Hot Water Valve is equipped with a cone-shaped disc which is opened or closed by one-half turn of the handle The stem is squared at its lower end and to this squared portlon is fitted a driving arm which actuates the disc. A right-hand thread is cut on the lower part of the stem and a little higher a left-hand thread is cut. This left-hand thread engages with the upper part of the body while the right-hand thread engages with the upper part of the disc cone.

When the stem ls turned to the right, the disc is revolved and at the same time drawn upward, thus closing the valve with a very tight joint. When the stem is turned to the left, the first portion of the movement releases the disc by forcing it downward.

When the motion of the stem is reversed, the driving arm moves one-eighth turn before it engages with the lug on the shell; consequently in all cases the shell is loosened or released by being forced upward or downward before the driving arm bears on the lug to revolve it. More metal is placed in those parts subjected to the greatest strain in service than is possible in ordinary valves of the same weight, and as this valve is somewhat heavier than ordinary makes, it follows that it must be considerably stronger. No spring is used and the stem is extra strong, being made from brass rod $\frac{9}{16}$ inch in diameter.

WITH UNION—ROUGH BODY, PLATED ALL OVER

Size, inches	½	¾	1	1¼	1½	2
No. 52 . .	$2.40	$2.85	$3.65	$5.05	$7.10	$10.85

For convenience when ordering, use numbers and sizes only.
On special order can be furnished with lock and shield.
See page 180 for roughing-in measurements.

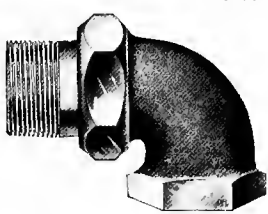
WATER RADIATOR VALVES

QUICK OPENING — BONNETLESS
WITH UNION, ROUGH BODY, PLATED ALL OVER

No.	Size, inches . . .	½	¾	1	1¼	1½	2
202		$2.40	$2.85	$3.65	$5.05	$7.10	$10.85

On special order can be furnished with lock and shield.

RADIATOR ELBOWS



WITH UNION, ROUGH BODY, PLATED ALL OVER

No.	Size, inches . . .	½	¾	1	1¼	1½	2
42		$1.75	$2.00	$2.50	$3.20	$4.00	$7.00

For convenience when ordering, use numbers and sizes only.
See page 180 for roughing-in measurements.

UNIQUE WATER RADIATOR VALVES

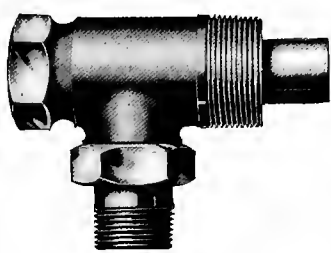
THE use of the Unique Valve does away with the connection at both ends of a water radiator. Its many advantages are apparent, not only for convenience, but in saving fitter's labor and pipe and fittings. Opens and closes with one-sixth turn of the handle.

Size Inches	Center to Center of Elbows Inches	Center of Body to End of Spud Inches	Center of Spud to Bottom of Elbows Inches	Tapping of Radiator when Valve is Used Inches	Price
½	5½	2⅞	1⅞	1¼	$4.25
¾	5¾	2⅞	1⅞	1¼	5.40
1	7	3	2	1½	5.80
1¼	7½	3¼	2⅝	2	7.95

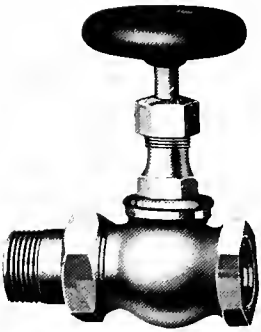
Send for special folder containing full description.

CAPITOL CIRCULATING COUPLINGS

THE Capitol Hot Water Circulating Coupling can be used with any water radiator valve to make up a connection whereby it is desired to have both the supply and return openings at one end of the radiator. Can be set at any angle to meet all conditions. The Circulating Coupling is screwed into the end of the radiator and the water valve screwed into the coupling.



Size Inches	Center of Coupling to End of Pipe Inches	Center of Coupling to Radiator End Inches	Center of Body to End of Spud Inches	Tapping of Radiator when Coupling is Used Inches	Price
½	1½	1⅝	2½	1	$2.50
¾	1¾	1¾	2¾	1¼	2.80
1	2	2⅛	2⅞	1½	3.70
1¼	2⅛	2¼	3½	2	4.50
1½	2⅛	2½	4	2	5.35



BRASS GLOBE RADIATOR VALVES

WITH UNION, JENKINS DISC,
ROUGH BODY,
PLATED ALL OVER

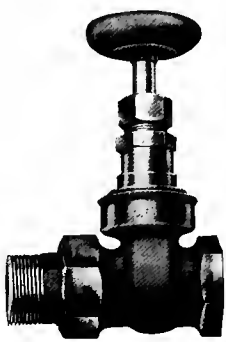
No.	Size, Inches					
	½	¾	1	1¼	1½	2
812	$3.15	$3.80	$4.75	$6.40	$8.10	$13.10

On special order, can be furnished with lock and shield.

STRAIGHTWAY RADIATOR VALVES

USED for hot water work where straightway connection is desired. Equipped with double brass gate and finished same as regular hot water radiator valves. Opens to the left; non-rising stem.

WITH UNION, ROUGH BODY,
PLATED ALL OVER

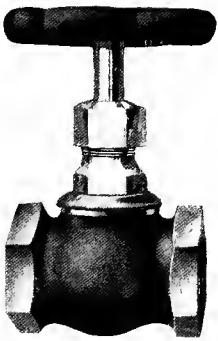


No.	Size, Inches					
	½	¾	1	1¼	1½	2
256	$3.65	$4.25	$5.20	$6.60	$9.00	$12.80

On special order, can be furnished with lock and shield.
For convenience when ordering, use numbers and sizes only.

BRASS GLOBE AND ANGLE VALVES

ROUGH BODY,
IRON WHEEL,
SCREWED



Globe Valve

Size, Inches .	⅛	¼	⅜	½	¾	1	1¼	1½	2
Standard .	$0.72	$0.72	$0.77	$1.00	$1.26	$1.80	$2.52	$3.50	$5.30
Jenkins Disc	1.10	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75

STRAIGHTWAY VALVES

No. 200—Brass, double gate, iron wheel, opens to left, non-rising stem, screwed ends.

No. 300—Standard, double gate, iron body, screwed or flanged ends.

NOTE—Orders for No. 300 must specify whether screwed or flanged ends are wanted.

Size, inches	½	¾	1	1¼	1½	2
No. 200 . .	$1.65	$2.05	$2.80	$3.70	$5.00	$7.30
Size, inches	2	2½	3	3½	4	4½
No. 300 screwed	$10.00	$11.50	$14.00	$17.00	$19.00	$24.00
No. 300 flanged	12.00	13.50	16.50	19.50	23.00	28.00
Size, inches .	5	6	7	8	10	12
No. 300 screwed	$27.50	$32.50	$45.00	$54.00	$90.00	$125.00
No. 300 flanged	31.50	36.50	49.00	58.00	95.00	133.00

TRITON AUTOMATIC AIR VALVES

Triton Air Valve

Triton Air and Vacuum Valve

THE Triton Air Valve is a well constructed valve made up with an expansion cylinder. In the shell of the valve is a sealed metal float with flexible top and bottom. This float contains a liquid easily affected by heat, which vaporizes at 151 degrees Fahr., expanding the corrugations, top and bottom, closing the valve against loss of steam or water. When the valve cools below the above temperature, the vapor condenses and the float contracts, thus opening the valve. Note that the valve does not open until the temperature falls to 151 degrees Fahr., thereby insuring an effective radiator when only vapor is in the system. The float being lighter than water, and sealed, carries perfect floatation, so that the valve will close tightly should there be water in the radiator. It is also equipped with baffle plate which prevents float from closing by sudden pressure. The valve may be cleaned and kept in perfect working order, as all parts are accessible. It is made entirely of metal and therefore this valve is practically indestructible. Guaranteed for five years.

No. 3. Triton Automatic Air Valve . . Price each, $1.15

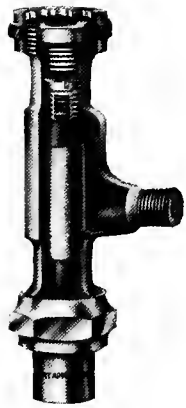
TRITON AIR AND VACUUM VALVE

The vacuum attachment permits all air to pass freely out of the radiator but prevents it from re-entering after pressure goes down. In all other respects the same as the No. 3.

No. 4. Triton Automatic Air and Vacuum Valve. Price each, $2.00

On special order, the No. 3 Triton Air Valve can be furnished with heat controller attachment or lock and shield at an extra charge of 25 cents net each.

PAUL AUTOMATIC AIR VALVES



FOR use on Paul systems, also as drip valves on radiators. The expansion post is reinforced by a brass encasement, therefore cannot buckle. Patented spring cap prevents seat from being crushed. Lead-packed cap does away with any possibility of leakage. Tapped ⅛-inch for connection to radiator; drip connection, ¼-inch.

Price each . . $1.25

On special order can furnish Valve of same description, 6½ inches long, with both side and bottom tapped ½-inch.

This Valve is adaptable for fan blast work and indirect radiation.

Minimum capacity, 200 square feet. Can also be made with union on side.

Price each $3.00

CAPITOL AUTOMATIC AIR VALVES

CAPITOL Automatic Air Valves have combination float and expansion post.

The valve body is made of brass, nickel-plated and highly finished. The post is made of a sensitive composition, the best known for the purpose.

The bottom connection of the No. 2 valve makes it particularly adapted for indirect radiators, coils, etc.

Both regularly threaded for ⅛-inch tapping.

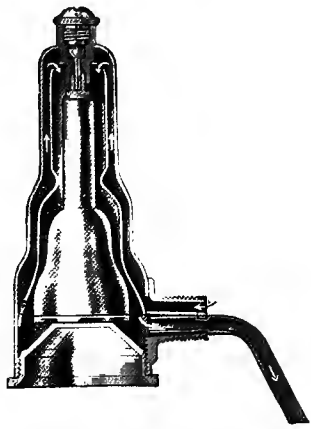
Can furnish No. 2 valve with ¼-inch tapping on special order.

No. 1 Capitol . . . . . price each, $0.75

No. 2 Capitol, with straight shank price each, 1.00

RUSSELL SIPHON AIR VALVES

AIR VALVE



AIR AND VACUUM VALVE

The Russell Valves are made entirely of the best steam metal and phosphor bronze. They are absolutely automatic and mechanically perfect. They can be easily taken apart and cleaned at any time.

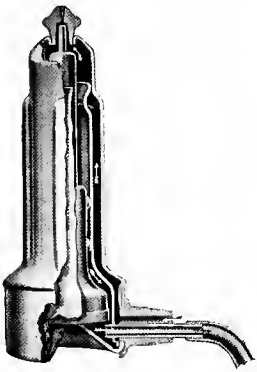
The Russell Non-Adjustable Automatic Air Valve will not leak steam or water. It is absolutely efficient, and keeps the last section of the radiator as hot as the first.

The Russell Siphon Air and Vacuum Valve operates on the fraction of an ounce pressure. It closes against the loss of steam, the loss of water, and the return of air, maintaining the full efficiency of every section of the radiator.

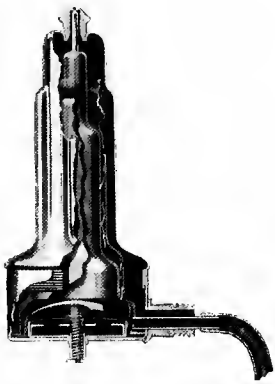
These valves are fully guaranteed for five years.

Russell Automatic Air Valve, with or without Siphon, List Each . $1.50
Russell Siphon Air and Vacuum Valve, List Each 3.00

HOFFMAN SIPHON AIR VALVES



Air Valve



Air and Vacuum Valve

THE Hoffman Siphon Air Valve is designed for the perfect venting of air from steam heated radiators. Made entirely of metal. Non-adjustable and absolutely automatic. The float is a sealed metal chamber with a flexible bottom and contains a volatile fluid which vaporizes at a comparatively low temperature. Hot air in the radiator is therefore as freely vented as cold air, which insures a steam hot radiator whenever steam is on.

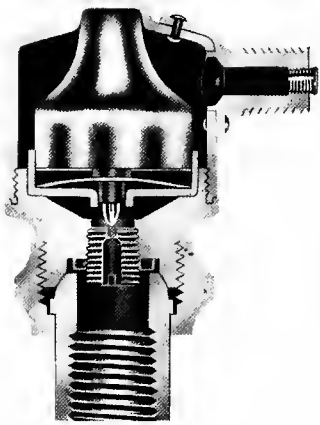
The two channels shown in the cut provide separate ways for the air and water, thus preventing the valve from "spitting" when water comes against it. The Hoffman Siphon Air Valve is guaranteed not to leak steam or water.

The Hoffman Siphon Air and Vacuum Valve is the very last word in Venting Valves. With 6 oz. pressure at the valve it permits the air to escape freely from the radiator, but automatically closes and prevents the return of air to the radiator when pressure ceases, thus holding the heat. With the exception of the bottom diaphragm which deflects and opens the valve with a 6 oz. pressure, the valve functions in every way the same as the Hoffman Siphon Air Valve. The reaction of the bottom diaphragm on cessation of pressure closes the valve and keeps it closed.

No. 1 Hoffman Siphon Air Valve. List each	**$1.90**
No. 2 Hoffman Siphon Air and Vacuum Valve. List each .	**4.50**
No. 7 Hoffman Jr. Air Valve. List each . . .	**1.40**

Send for special descriptive circulars of the Hoffman Valves.

HOFFMAN "AIR LINE" VALVE



The Hoffman "Air Line" Valve is an automatic and non adjustable air line valve for drip or vacuum air line service. The expansible medium is a volatile or heat-sensitive fluid, which is contained in a sealed metal chamber having a flexible bottom made of phosphor bronze. When the temperature of the valve reaches 190 degrees Fahrenheit, the volatile vapor condenses and the diaphragm or flexible bottom reacts and opens the valve. As long as the steam is against the valve it remains closed, but the instant steam ceases, it is wide open for the free passage of air. The port is either wide open or closed tight.

The sectional cut also shows a channel screw in the radiator nipple of the valve. The function of this screw is to enable the fitter to balance the system, by giving him means to positively control the velocity of the steam as it enters each particular radiator. Screwing in the screw decreases the size of the inlet into the valve, thus decreasing the velocity of the steam, while screwing out the screw increases it.

Nipple connection for radiator, ⅜" iron pipe thread.

Air Line connection, ¼" iron pipe thread.

No. 3 Hoffman "Air Line" Valve, list each $2.50

HOFFMAN JUNIOR QUICK VENT AIR VALVE

For Quick Vent Service Where Water is not a Factor

This valve is designed to meet a demand for Quick Vent Service at the end of basement heating mains, the top of risers, or any indirect radiators, stacks or coils. The valve closes tight against steam emission, but remains wide open for the free passage of air. It does not close against water.

The shank of this valve is ¼" iron pipe thread.

No. 4 Hoffman Junior Quick Vent Air Valve, list each..... $2.80

HOFFMAN QUICK VENT "FLOAT" AIR VALVE

For quick vent service where it is desired to control or prevent the emission of either steam or water through the valve. The shank of this valve is ⅜" iron pipe thread.

No. 5 Hoffman Quick Vent "Float" Air Valve, list each..... $8.00

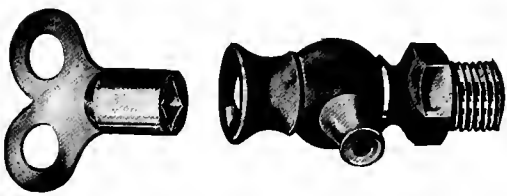
HOFFMAN QUICK VENT "FLOAT" AIR and VACUUM VALVE

This valve is designed to perform the same service as the Hoffman Quick Vent "Float" Air Valve, but it also prevents the return of air to the radiator, stack, or line to which it is connected when pressure ceases at the valve. The shank of this valve is ⅜" iron pipe thread.

No. 6 Hoffman Quick Vent "Float" Air and Vacuum Valve, list each... $12.00

COMPRESSION AIR VALVES

No. 8. Wood Wheel, nickel-plated, per dozen . $2.00



No. 9. With Key, nickel-plated, per dozen $1.80

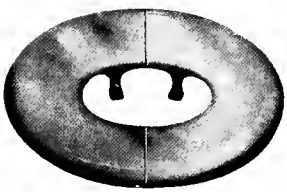
No. 10. Positive and automatic, nickel-plated, per dozen $3.00

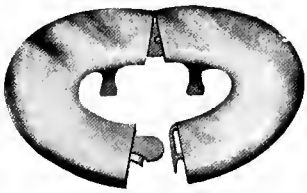
This valve can be used with equal facility as a positive or an automatic air valve without change or adjustment. It operates very quickly and will last a lifetime. Fully guaranteed.

All above valves threaded for ⅛-inch tapping.

FLOOR AND CEILING PLATES

CAPITOL





The Capitol Floor and Ceiling Plate is one of the strongest and neatest now on the market. Made of cold rolled steel, coppered before nickel plating, halves securely riveted by a concealed hinge. Can be opened or closed on pipe without effort.

Nickeled

For pipe	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
Each	$0.25	$0.26	$0.27	$0.28	$0.32	$0.35	$0.38	$0.45	$0 65	$0 80	$1.00	$1.25

Black

For pipe	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
Each	$0.14	$0.15	$0.16	$0.17	$0.20	$0.22	$0.25	$0.30	$0.50	$0.65	$0.80	$1.00

RITON

A heavy stamped steel adjustable floor and ceiling plate; handsome in design and substantially constructed.

It is held firmly to the pipe by four jaws, stamped to conform to the pipe.

This plate cannot be equalled in finish by any plate on the market; it is nickeled on copper and highly polished.

For pipe	½	¾	1	1¼	1½	2	2½	3
Nickeled, each	$0.27	$0.28	$0.32	$0.35	$0.38	$0.45	$0.65	$0.80
Black, each	.16	.17	.20	.22	.25	.30	.50	.65

FLOOR AND CEILING PLATES

B. AND C.

Ceiling

B. and C. adjustable hinged plates are constructed so that the ceiling plate is held in place by means of a set screw, and the floor plate snapped around the pipe. Copper-plated before nickeling. Specify whether floor or ceiling plates are wanted.

Nickeled

For pipe	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
Each	$0.25	$0.26	$0.27	$0.28	$0.32	$0.35	$0.38	$0.45	$0.65	$0.80	$1.00	$1.25

Black

For pipe	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
Each	$0.14	$0.15	$0.16	$0.17	$0.20	$0.22	$0.25	$0.30	$0.50	$0.65	$0.80	$1.00

CHAIN PIPE HANGERS

A very convenient and economical pipe hanger, strong and easy to adjust.

Size of Chain No.	For Pipe Inches	Chain		Ox Bow Hangers	
		Tensile Strength Pounds	Price per 100 Feet	Size	Price Per C
4	1 to 1¼	540	$2.75	Small	$3.00
2	1½ to 2	700	3.10		
0	2½ to 3	1150	4.00	Large	4.50
000	3½ to 8	1800	5.25		

Chain shipped only in packages containing 100 feet. Not necessary to order hangers unless this manner of fastening is desired. If hanger is wanted specify exact number to be shipped.

CAPITOL HOT WATER THERMOMETERS

No. 10 Straight

No. 20 Angle

THE Capitol Hot Water Thermometer will record temperatures accurately and quickly. Care should be taken to be sure that the metal tube surrounding the glass bulb is thoroughly immersed in the hot water. Lower part of the tube is immersed in a mercury bath.

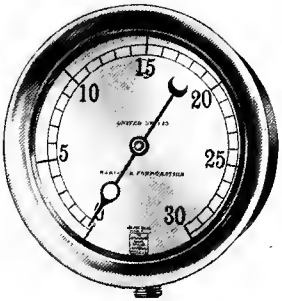
If face does not set in right position when tightened, loosen the screw on the tail-piece, turn face to correct position without lifting, then tighten screw.

Regularly furnished with red spirit liquid, which indicates the temperature more clearly than thermometers made up with mercury columns.

Each thermometer tested before leaving the factory and carefully packed. Threaded for ½-inch tapping.

No. 10 Straight . . .	price each $1.70
No. 20 Angle .	price each 2.00

CAPITOL GAUGES

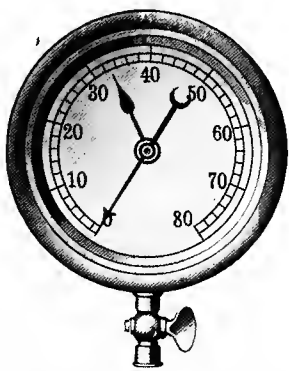


STEAM GAUGE

Registers pressure up to 30 pounds. Movement made of non-corrosive metal. Price each without cock $3.30

Can supply high pressure gauges when required. Write for prices

ALTITUDE GAUGE



Indicates at the boiler the height of water in the system. Fitted with red adjustable hand, to be set at height desired by the user. The black operating hand indicates the actual height of water and therefore shows any variations in the water level.

To set: Fill the system to its proper level, move red hand to the height indicated by the operating hand. Water should be added as soon as the water falls below the height indicated by the red hand. Ring that holds glass is secured by cotter pins to permit easy removal for setting.

Price each, with cock . $3.70

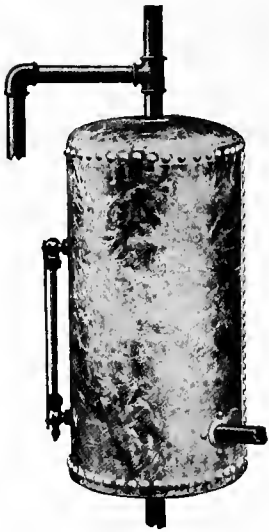
COMPOUND GAUGE

Compound gauges register steam pressure to 30 pounds and vacuum to 30 inches.

Price each, without cock . $5.00

SPECIFICATIONS COVERING ALL GAUGES LISTED

4½-inch dial, iron case, no back flange, flare nickeled ring, silvered dials and black letters. Made from highest grade material with the utmost care used in testing.



CAPITOL EXPANSION TANKS

TAPPED at top for 1-inch overflow pipe; at bottom for 1-inch expansion pipe; at side for water supply.

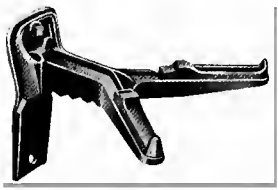
Made from a superior grade of heavy boiler steel, riveted and galvanized.

Are to be preferred in every case to the ordinary tanks of light iron, which are liable to collapse and have no durability.

Capacity Gallons	Size Inches	Square Feet of Radiation	Price Each Without Trimmings	Price Each Complete With Trimmings
8	10 x 20	250	$ 7.50	$ 9.25
10	12 x 20	300	8.00	9.75
15	12 x 30	500	9.00	10.75
18	12 x 36	600	9.50	11.25
20	14 x 30	700	12.50	14.25
26	16 x 30	950	14.00	15.75
32	16 x 36	1300	15.00	16.75
42	16 x 48	2000	16.50	18.25
66	18 x 60	3000	31.00	32.75
82	20 x 60	5000	37.00	38.75
100	22 x 60	6000	51.00	52.75

NOTE—Horizontal Expansion Tanks can be furnished on special order.

CAPITOL EXPANSION TANK BRACKETS

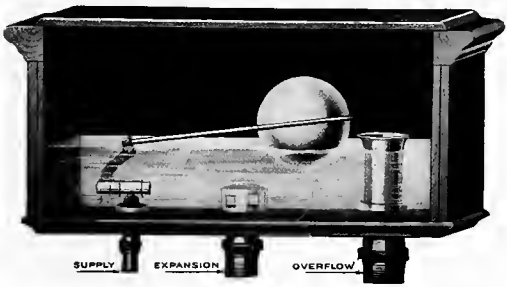


EASIER and cheaper to install than building a shelf. It can be adjusted for all sizes of tanks from 10 to 16 inches in diameter. Furnished with necessary screws.

Weight, 5½ pounds.

Price each, complete, $1.75.

CAPITOL
AUTOMATIC EXPANSION TANKS



USED in connection with hot water systems, they insure a full supply of water, at the same time taking care of the overflow. Made of hard wood, lined with sheet copper and furnished with cast brass fittings. Neither gauge glass nor altitude gauge is needed with them and with their use there is no danger of freezing when placed in attic or out of the way closet.

The inside measurements are:

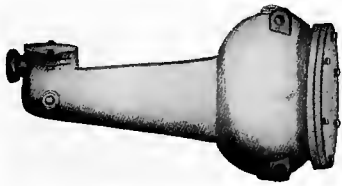
Length, 20 inches. Width, 9 inches. Depth, 10 inches.

Can be used on any hot water job containing up to 3000 feet of radiation.

No. 302, Plain Oak, varnished, square corners price each $8.50

On special order can be finished in cherry, walnut or quartered oak at extra charge of $1.25 each, net.

CAPITOL
AUTOMATIC WATER FEEDERS

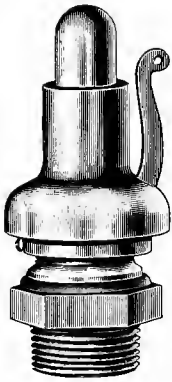


FOR automatically controlling the water level of low pressure heating boilers. Can be cleaned without disturbing pipe connection. Supplied with or without water gauge.

SPECIFICATIONS

Height, 12 inches. Length, 24 inches. Width, 9 inches.
Boiler connection, 1 inch. Feed water inlet, ¾ inch.

No. 61 Without gauge . . . . . price each $15.00
No. 62 With gauge . . . . . price each 18.00



BRASS POP SAFETY VALVES

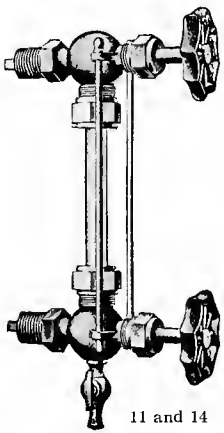
WITH IRON BASE

THIS low pressure pop safety valve is well proportioned and its construction includes all the features necessary to make it reliable and efficient. Regularly set at 15 pounds but it may be easily adjusted to any pressure up to twenty pounds. Can be drilled for seal without extra cost.

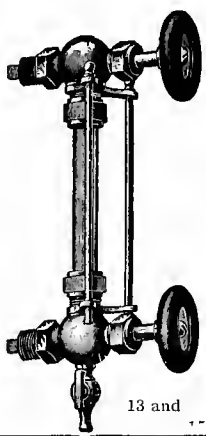
Size, inches	¾	1	1¼	1½	2	2½	3
Finished body	$10.00	$12.00	$15.00	$20.00	$30.00	$50.00	$65.00

BRASS WATER GAUGES

SELF-CLEANING



11 and 14



13 and

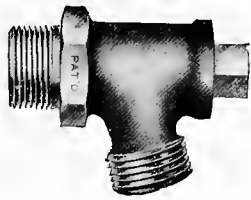
Number	Body	Wheels	Connections Iron Pipe Size, Inches	Size of Glass	List per Set
11	Rough, Bronzed	Iron	½	⅝ x 12	$3.00
13	Polished.	Wood	½	⅝ x 12	4.25
14	Rough, Bronzed	Iron	¾	¾ x 16	4.50
15	Polished.	Wood	¾	¾ x 16	5.50

COMPRESSION GAUGE COCKS

WITHOUT STUFFING BOX

No. 40 Wood Handle, threaded for iron pipe, ⅜-inch, list each, $0.85
No. 44 Wood Handle, threaded for iron pipe, ½-inch, list each, .90

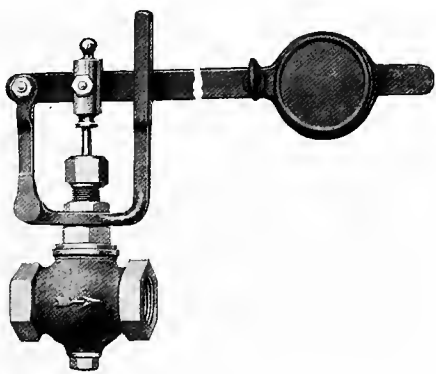
BOILER DRAW-OFF COCKS



THIS patent stop draw-off cock is made so that the plug cannot be removed. Furnished in ½ or ¾-inch sizes, with ¾-inch iron pipe connection for hose.

No. 70	½-inch, list each	$0.75
No. 71	¾-inch, list each	.75

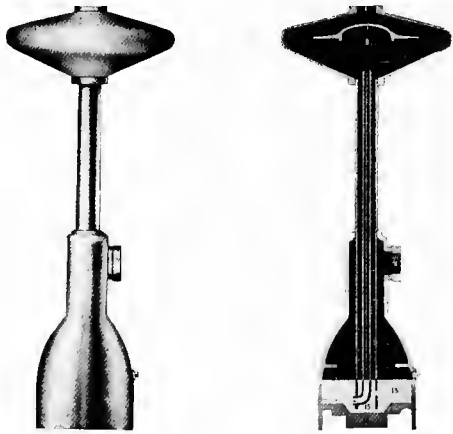
CAPITOL REGULATING VALVES



VERY widely used for the control of steam, water, air or gas. Especially suitable for use in connection with heat regulating devices. Also recommended for any service where an extremely sensitive and positive action is necessary. The areas of the body and all openings are full size, and are of such form to insure an unobstructed passage. Made with two bevel seat discs. The upper opening is slightly larger to permit the lower disc to pass. No matter what the pressure, only a slight movement of the float is required either to open or close the valve.

Size, inches	½	¾	1	1¼	1½
Brass, screwed	$5.50	$5.50	$6.00	$7.25	$9.00
Size, inches	2	2½	3	3½	4
Brass, screwed	$15.00	$21.00	$34.00	$50.00	$65.00
Iron body, screwed			32.00	40.00	50.00

HONEYWELL HEAT GENERATORS



THESE generators are designed to meet the demand for a device to quicken the circulation in hot water heating jobs and broaden the range of temperatures.

When connected to the expansion pipe of an ordinary gravity plant, this generator seals the circuit and permits the generation of a slight pressure up to ten pounds, at which point it relieves itself through the operation of a mercury seal, eliminating any element of danger.

The pressure created by this generator will assist in remedying any unsatisfactory job of hot water heating where the radiation is insufficient, the piping too small for gravity, the circulation sluggish, or where the water boils easily from quick firing, provided, of course, the boiler is large enough to supply the heat. It also greatly improves jobs which contain long horizontal mains or where radiation is all located on the first floor. Should large piping be used in connection with the generator, one size smaller radiator tapping than regular should be used near the boiler.

It is positive and automatic, sold under the strongest guarantee, will last a lifetime and cannot get out of order.

Sectional outline view shows connection to system, circulating pipe and deflecting plate.

Price List

No. 1 for	1,200 square feet of radiation	$25.00
No. 2 for	2,500 square feet of radiation	35.00
No. 3 for	3,500 square feet of radiation	50.00
No. 4 for	10,000 square feet of radiation	65.00

HONEYWELL WATER REGULATOR

A simple and positive instrument for regulating the temperature of water in a hot water heating system or storage tank. It has a temperature range of from 120 to 220 degrees and will keep the water in the system at any degree between these temperatures. When properly connected, it will open and close the dampers within a water temperature change of two or three degrees. The Regulator is 10" in height, 5" from bottom of bulb to top of threads, and 5" from the latter point to the top of regulator. The neck is threaded for 1½" pipe opening.

With each Regulator are furnished chains and pulleys, a lever three feet in length, and two ball weights.

When used for controlling the temperature of water in storage tanks where water is heated by a tank heater, the regulator may be connected into one of the tappings on the top of the heater, if convenient, and the weights so placed on the lever, that any temperature may be maintained in the tank, as long as there is fire in the heater.

Especially suitable for regulating the temperature of water in greenhouse heating plants.

No. 3 Honeywell Water Regulator, list $20 00

THE HONEYWELL

TANK-IN-BASEMENT METHOD OF HOT WATER HEATING

Honeywell Tank-in-Basement equipment consists of a Special Honeywell Heat Generator and a No. 3 Water Regulator, which lists at the following prices:

For Plants Containing 2,000 sq. ft. or Less of Radiation

No. 11 for one story buildings	$48.00
No. 12 for two story buildings	52.00
No. 13 for three story buildings	56.00
No. 14 for four story buildings	60.00

For Plants Containing 2,000 to 6,000 sq. ft. of Radiation

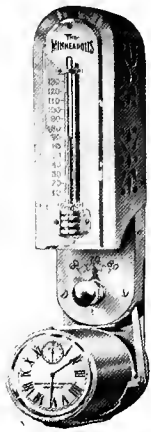
No. 21 for one story buildings	$68.00
No. 22 for two story buildings	76.00
No. 23 for three story buildings	84.00
No. 24 for four story buildings	92.00

Special Welded Air-Tight Expansion Tanks Having no Tappings Above the Water Line

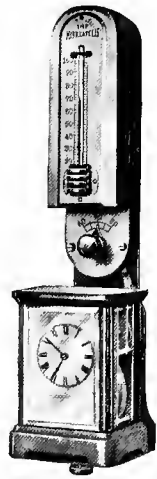
21 Gallons, Size, 12x42, List	$ 9.00
30 Gallons, Size, 12x60, List	10.00
40 Gallons, Size, 14x60, List	11.00

For radiator tappings for Honeywell system, see page 245.

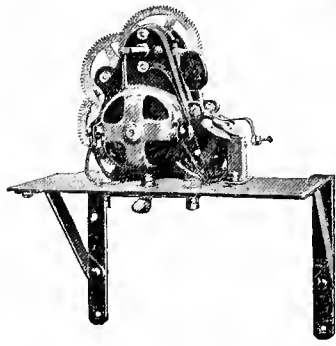
MINNEAPOLIS HEAT REGULATORS



Model No. 47



Model No. 60



Non-Wind Motor

LIST PRICES

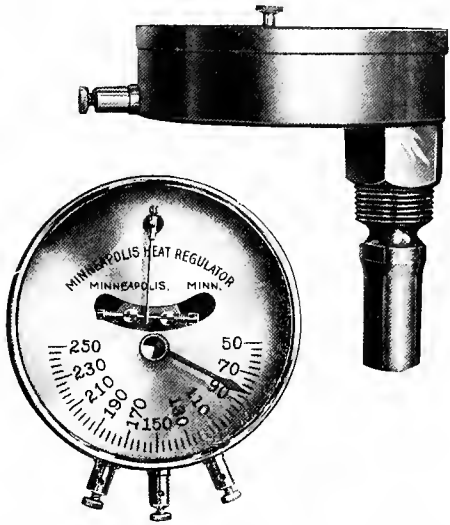
Shipping weight, approximately 30 lbs. each.

No. 35 (with 1-day time) Gravity Motor only $35.00

Spring Motor		D. C. Motor		A. C. Motor	
No. 40 (no time)	$40.00	No. 40 D. C.	$50.00	No. 40 A. C.	$60.00
No. 47 (1-day time)	$47.00	No. 47 D. C.	$57.00	No. 47 A. C.	$67.00
No. 57 (double clock)	$57.00	No. 57 D. C.	$67.00	No. 57 A. C.	$77.00
No. 60 (8-day time)	$60.00	No. 60 D. C.	$70.00	No. 60 A. C.	$80.00

Important Note:—Order by Model number and if Electric, specify D. C. or A. C. Our A. C. Motors are 110 volts, 60 cycle.

MINNEAPOLIS TANK REGULATORS



THIS device has the same electrical construction and is regulated in the same manner as the Minneapolis Heat Regulator—the only difference being in the extension.

In connection with the motor, it controls valves, dampers, etc, for the regulation of Hot Water, Steam, Bake Ovens, Vulcanizers, etc.

The extension is put through the side of boiler or other receptacle and firmly fastened into place by the screw thread, thereby making a perfectly tight joint, having the case and dial outside.

This regulator is used extensively in apartments, hospitals, public buildings, or any place where hot water is required throughout the year. Prevents water boiling and is a fuel saver. If necessary can be made to a range of 400 degrees Fahrenheit.

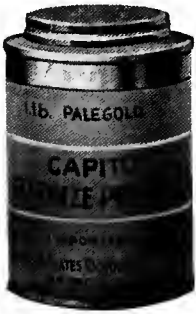
Size of thermostat, 4 inches. Length of extension, 2 inches. If longer extension is required, it can be furnished at an additional charge.

No. 65, hot water or tank; $65.00. No. 65 D. C., $75.00. No. 65 A. C., $85.00

Important Note:—Order by Model number and if Electric, specify D. C. or A. C. Our A. C. Motors are 110 volts, 60 cycle.

CAPITOL BRONZES

WE have devoted considerable study to the question of offering the trade a line of Radiator Bronzes that would recommend itself after it had once been used. Our strongest effort has been to furnish the best values, considering carefully the rich and brilliant finish, amount of covering capacity and lasting qualities.



DIRECTIONS FOR USE

BRONZES—Use a bronze primer, or if you want to finish a job quickly, give the radiator first a coat of bronzing liquid; this will dry in about twenty minutes with a gloss, covering up all the dirt and rust. Then mix the bronze powder with the bronzing liquid to the consistency of cream and apply evenly, that is, in one direction only Always use a soft brush, as a stiff brush cuts the bronze, ruining the high finish. If bronze is applied when radiator is warm, the lustre is improved.

One pound of gold or color bronze requires one quart of liquid and will cover from 250 to 300 square feet of radiation.

One pound of aluminum bronze requires about one gallon of liquid and will cover from 500 to 600 square feet of radiation.

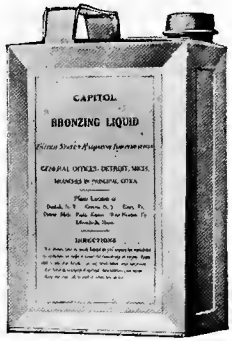
CAPITOL BRONZE POWDERS

	List, Each
Pale Gold, one-pound cans	$0.90
Rich Gold, one-pound cans	.90
Pure Metal Leaf, one-pound cans	1.25
(Pure Metal Leaf Bronze is the highest grade of pale gold, unrivalled in brilliancy and permanency of tone and color.)	
Aluminum, one-pound cans	1.50
Aluminum, half-pound cans	.90
(Aluminum Bronze guaranteed chemically pure.)	
Green, one-pound cans	1.25
Maroon, one pound cans	1.50
Chocolate, one-pound cans	1.50
Copper, one-pound cans	1.25
Fire, one-pound cans	1.25

To get best results we recommend the use of Capitol Bronzing Liquid.

We can furnish on application, color card showing above and other special colors.

CAPITOL BRONZING LIQUID



A LIQUID for use in mixing with gold, aluminum or other bronze powders; to act as a vehicle for them and a binder to the surface over which they are applied. The color is so light that it has no effect on the most delicate bronze tints, and the body is such that it does not interfere with the lustre of the bronze itself.

When liquid is not in use, keep can tightly covered, otherwise evaporation takes place, thickening the liquid and making it unuseable. Mix only in clean cans. Put up in gallon, half gallon and quart cans.

CAPITOL BRONZE PRIMER

Especially made for use on radiators, as it does not contain any material of non-radiating nature. It is used as a filler, making a smoother surface and reducing the amount of bronze necessary for the work. Furnished in same size cans as bronzing liquid.

CAPITOL MAROON JAPAN

Makes an attractive finish at a low cost, dries quickly with a high gloss which is not effected by heat. Recommended for use on radiators in public places where durability counts. Supplied in gallon, half-gallon and quart cans.

BLACK ASPHALTUM

For painting boilers, castings, steam or water pipes, etc. Regularly sold in one gallon cans. Special price quoted in barrel lots.

CAPITOL RADIATOR ENAMEL

An air drying enamel especially made for use on radiators, where a hard heat-resisting durable finish is required. All colors are permanent, and will not crack, chip or shrink.

Made in the Following Colors

White Gloss	Ash
White Flat	Vera Blue
White Egg Shell	Light Blue
Ivory	Cadet Blue
Yellow	Goeblin Blue
Orange	Navy Blue
Pink	Light Green
Silver Gray	Dark Green
Oak Brown	Blue Green
Moss Green	Vermillion
Gloss Black	Royal Red
Dead Black	Maroon

Put up in One Quart, Half Gallon and One Gallon Cans.

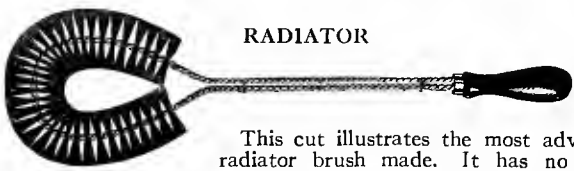
CAPITOL BRUSHES

BRONZING

CAPITOL Bronzing Brushes have extra long handles, making them most practical for easily bronzing radiators. The bristles are of fine quality, especially suited for high grade work.

1-inch, each, $0.40 — 2-inch, each, $0.60
1½-inch, each, .50 — 2½-inch, each, .70

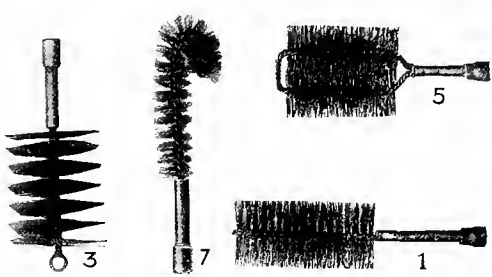
RADIATOR



This cut illustrates the most advanced radiator brush made. It has no wood parts to break, the bristles are held securely and it is otherwise very durable. The shape and size make it possible to remove any accumulation of dust from the interior surface of the radiator with one motion of the brush. Also handy for cleaning between spindles of stairway, under heavy furniture or in out of the way corners.

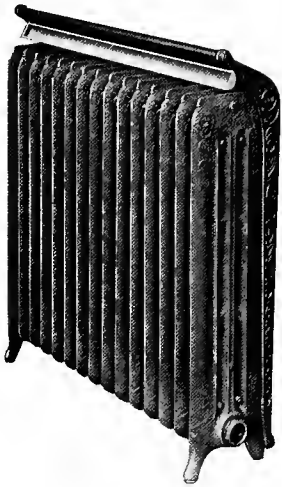
Capitol Radiator Brushes . . list each, $0.80

FLUE



Number	Description	Price List
1	Round wire, 3 inches diameter	$1.00
2	Round wire, 3 inches diameter, same as No. 1, except with 55-inch flexible wire handle .	1.20
3	Flat tempered wire, 2 x 3¼ inches oval sides	1.30
4	Flat tempered wire, 3 x 4 inches oval sides	1.40
5	Double brush, 1¾ x 4½ x 4 inches	1.50
6	Double brush, 2½ x 6 x 4 inches . .	2.00
7	Round end, fine wire, 1¼ inches diameter	1.00
8	Round end, fine wire, 1½ inches diameter	1.00

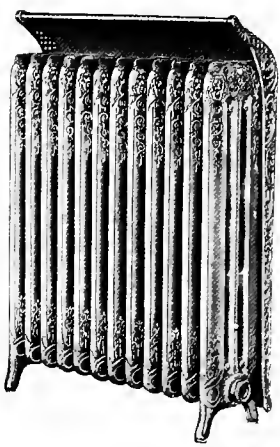
CAPITOL RADIATOR SHIELDS



Equipped with patented dust retainer, which can be lowered for cleaning.

The retainer is held in its closed position by means of springs at each end.

TRITON RADIATOR SHIELDS



Without dust retainer.

When ordering, state whether full, medium or short length shields are desired. Also give name, height and number of sections in radiator. If unable to give name of radiator, state length of radiator over all at top, and distance between center of each section.

*On special order, shields of any exact lengths will be made. Shields are made special and orders are not subject to cancellation.

CAPITOL RADIATOR SHIELDS

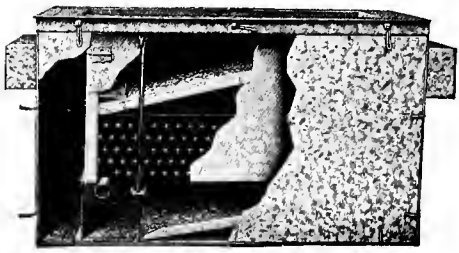
No. of Loops or Sections in Radiator	1 Column		2 and 3 Column		4 Column	
	Sheet Steel C. I. Brackets	Sheet Steel Gold Brzd. Copper, Aluminum etc., C. I. Brackets	Sheet Steel C. I. Brackets	Sheet Steel Gold Brzd. Copper, Alumnum, etc., C. I. Brackets	Sheet Steel C. I. Brackets	Sheet Steel Gold Brzd., Copper, Aluminum, etc., C. I. Brackets
3–6	$ 2.87	$ 5.49	$ 3.18	$ 6.09	$ 3.49	$ 6.69
7	3.10	5.64	3.44	6.26	3.78	6.88
8	3.30	5.99	3.66	6.65	4.02	7.31
9	3.53	6.24	3.92	6.93	4.31	7.62
10	3.79	6.51	4.21	7.23	4.63	7.95
11	4.05	6.75	4.50	7.50	4.95	8.25
12	4.32	7.05	4.80	7.83	5.28	8.61
13	4.59	7.32	5.10	8.13	5.61	8.94
14	4.85	7.58	5.38	8.42	5.91	9.26
15	5.17	7.89	5.74	8.76	6.31	9.63
16	5.47	8.19	6.07	9.09	6.67	9.99
17	5.91	8.48	6.56	9.42	7.21	10.36
18	6.31	8.78	7.01	9.75	7.71	10.72
19	6.42	9.14	7.13	10.15	7.84	11.16
20	6.75	9.40	7.50	10.44	8.25	11.48
21	7.10	9.71	7.88	10.78	8.66	11.85
22	7.45	10.04	8.27	11.15	9.09	12.26
23	7.80	10.35	8.66	11.50	9.52	12.65
24	8.10	10.70	9.00	11.88	9.90	13.06
25	8.54	11.02	9.48	12.24	10.42	13.46
26	8.91	11.37	9.90	12.63	10.89	13.89
27	9.31	11.70	10.34	13.00	11.37	14.30
28	9.70	12.06	10.77	13.40	11.84	14.74
29	10.10	12.41	11.22	13.78	12.34	15.15
30	10.52	12.78	11.68	14.19	12.84	15.60

TRITON RADIATOR SHIELDS

No. of Loops or Sections in Radiator	1 Column		2 and 3 Column		4 Column	
	Sheet Steel C. I. Brackets	Sheet Steel Gold Brzd. Copper, Aluminum etc., C. I. Brackets	Sheet Steel C. I. Brackets	Sheet Steel Gold Brzd. Copper, Aluminum, etc., C. I. Brackets	Sheet Steel C. I. Brackets	Sheet Steel Gold Brzd., Copper, Aluminum, etc., C. I. Brackets
3–6	$1.91	$ 3.66	$ 2.12	$ 4.06	$ 2.33	$ 4.46
7	2.07	3.82	2.29	4.24	2.51	4.66
8	2.20	3.99	2.44	4.43	2.68	4.87
9	2.36	4.16	2.62	4.62	2.88	5.08
10	2.53	4.34	2.81	4.82	3.09	5.30
11	2.70	4.51	3.00	5.01	3.30	5.51
12	2.88	4.70	3.20	5.22	3.52	5.74
13	3.06	4.88	3.40	5.42	3.74	5.96
14	3.24	5.05	3.59	5.61	3.94	6.17
15	3.45	5.26	3.83	5.84	4.21	6.42
16	3.65	5.46	4.05	6.06	4.45	6.66
17	3.94	5.66	4.37	6.28	4.80	6.90
18	4.06	5.85	4.51	6.50	4.96	7.15
19	4.28	6.10	4.75	6.77	5.22	7.44
20	4.50	6.27	5.00	6.96	5.50	7.65
21	4.73	6.48	5.25	7.19	5.77	7.90
22	4.96	6.69	5.51	7.43	6.06	8.17
23	5.20	6.91	5.77	7.67	6.34	8.43
24	5.40	7.13	6.00	7.92	6.60	8.71
25	5.69	7.35	6.32	8.16	6.95	8.97
26	5.94	7.58	6.60	8.42	7.26	9.26
27	6.21	7.81	6.89	8.67	7.57	9.53
28	6.47	8.04	7.18	8.93	7.89	9.82
29	6.74	8.28	7.48	9.19	8.22	10.10
30	7.02	8.52	7.79	9.46	8.56	10.40

Can also be furnished in solid brass, with electro plated brackets; or in solid brass with solid brass brackets; or in all solid brass, nickel plated.

CAPITOL
INDIRECT RADIATOR CASINGS

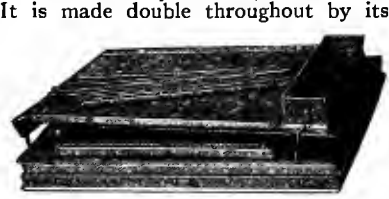


THE Capitol Indirect Radiator Casing is built so that the air is brought in direct contact with the entire radiator instead of passing around the sides and ends; consequently the efficiency of any indirect radiator is increased when this patented casing is used.

The air can be admitted at the side, bottom, or ends, no cold air inlet being placed on the casing unless ordered, for the reason that it may be brought in at any one of the four places desired.

The parts of the casing are neither bolted nor riveted, but have tight fitting slip joints held in place by turn clips, making it easy of access so that it can be taken apart for repairs to the radiator or for the purpose of cleaning.

It is shipped "knocked down" in such a way that the entire casing can be put up in from fifteen to twenty minutes, which means a great saving of labor. It is made double throughout by its partitions; to retain the heat, has a 2-inch air space on the sides, and the ends are lined with sheet asbestos paper.



It is regularly made up with 24 or 26 gauge galvanized iron, with hangers furnished for all kinds of construction. The rods to carry the radiators vary in size according to weight of radiator. Indirect radiators should hang 10 or 12 inches below the ceiling, with the same amount of space at the bottom of the casings, and hangers are sent out accordingly.

To obtain the cost, multiply the number of feet in the radiator by the price per foot. The following list prices include necessary hangers and lag screws:

PRICE LIST

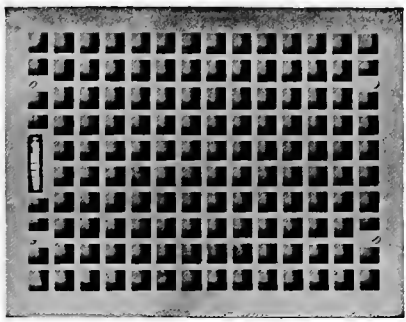
75 feet and under	$0.28 per foot
76 to 100 feet inclusive	.26 per foot
101 to 125 feet inclusive	.24 per foot
126 to 150 feet inclusive	.22 per foot
Over 150 feet	.20 per foot

Casings without inner side walls, but asbestos lined, can be furnished at a reduction of 4 cents per foot from above list prices.

Complete circular furnished on request.

REGISTERS

FOR EITHER FLOOR OR WALL



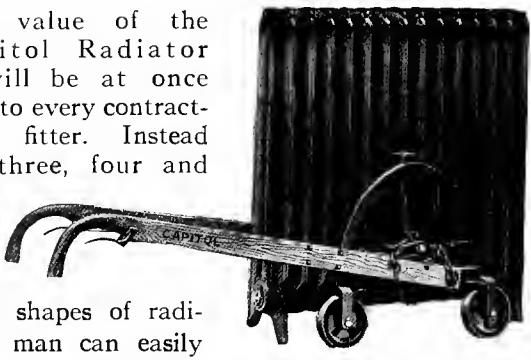
STANDARD LIST

Size Inches	Black Japanned			Electro-plated in Nickel or Bronzed in Gold		
	Register	Register Face	Floor Border	Register	Register Face	Floor Border
6 x 8	$1.55	$1.00	$1.15	$2.80	$2.25	$2.40
6 x 10	1.60	1.05	1.20	3.00	2.45	2.60
6 x 12	1.85	1.25	1.45	3.50	2.90	3.10
8 x 10	1.65	1.10	1.25	3.15	2.60	2.75
8 x 12	1.90	1.30	1.50	3.65	3.05	3.25
9 x 12	2.10	1.45	1.65	4.00	3.35	3.55
9 x 15	3.95	2.65	2.65	6.50	4.90	5.20
10 x 12	2.40	1.70	1.75	4.40	3.70	3.75
10 x 14	3.15	2.20	2.20	5.25	4.30	4.30
10 x 16	4.85	2.95	2.95	7.20	5.30	5.30
12 x 14	4.35	2.80	2.80	6.85	5.35	5.35
12 x 15	4.50	2.90	2.90	7.00	5.40	5.40
12 x 16	5.60	3.50	3.50	8.25	6.15	6.15
12 x 18	6.80	3.90	3.90	9.55	6.65	6.65
12 x 19	7.50	4.00	4.00	10.35	6.85	6.85
14 x 16	8.50	4.30	4.30	11.50	7.30	7.30
14 x 18	9.00	4.50	4.50	12.00	7.50	7.50
14 x 20	9.50	4.80	4.80	13.00	8.50	8.50
16 x 18	12.00	5.30	5.30	16.20	9.50	9.50
16 x 20	12.35	6.10	6.10	16.55	10.30	10.30
16 x 22	14.75	6.70	6.70	19.50	11.50	11.50
16 x 24	15.00	7.00	7.00	20.00	12.00	12.00
18 x 21	20.50	7.75	7.75	26.00	13.25	13.25
18 x 24	21.50	8.35	8.35	27.75	14.60	14.60
20 x 24	22.00	8.60	8.60	28.20	14.80	14.80
20 x 26	23.50	9.50	9.50	32.00	17.50	17.50
20 x 30	33.50	13.50	13.50	43.00	23.50	23.50
24 x 30	38.00	17.25	17.25	50.00	29.25	28.25
24 x 36	50.00	22.00	22.00	65.50	37.50	34.25
30 x 36	67.50	28.50	28.50	90.00	51.00	41.00
30 x 42	77.50	33.00	29.00	102.00	57.50	50.50

For the price of a ventilator add 50 cents list to the regular Register list on all sizes smaller than 14 x 14 or $1.00 list if 14 x 14 or larger. When ordering it should be stated whether Ventilators are for side wall or for ceiling.

CAPITOL RADIATOR TRUCK

MADE IN TWO SECTIONS



Patented February 12, 1907

THE value of the Capitol Radiator Truck will be at once apparent to every contracting steam fitter. Instead of two, three, four and even six men tugging at different sizes and shapes of radiators, one man can easily handle and move the heaviest one. It needs absolutely no adjustment and can be operated more quickly and easily than any other article of its kind.

By using this truck, the radiator can be easily moved through the narrowest doorway, behind counters, under stairways or into the oddest corners of a room.

Can be furnished with either plain wheels for ordinary work, or rubber tire wheels where it is necessary to move radiators over the finest floors of wood or tile, without any danger of damaging them. Made in one size only to fit all radiators.

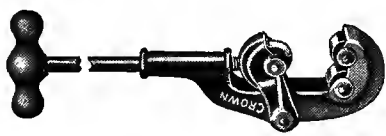
Each truck is thoroughly tested and guaranteed to do the work as represented. The frames of these trucks are made of malleable iron, thereby insuring a truck that will stand the wear and tear occasioned through rough handling and constant use. Weight, 70 pounds.

Plain wheels .	price each, $25.00
Rubber tire wheels	price each, 30.00

CAPITOL SPUD WRENCHES

WITH this wrench, connections for radiator valves and elbows can be quickly made tight, without danger of injuring the union. Arranged to fit unions on ¾-inch, 1-inch, 1¼-inch and 1½-inch sizes. Price each, list $0.60

CROWN PIPE CUTTERS



These pipe cutters are equipped with patented notched edge wheel, which saves one-half the time and labor in cutting. All wearing parts are well supported, the wheels and pins are made of the best tool steel. Numbers 2 and 3 cutters have a tapped hole in bottom of frame, which allows operator to screw in a piece of pipe to be used as an extra handle if desired.

Numbers	1	*2	3
Cut pipe, inches	⅛ to 1	½ to 2	2½ to 4
List each	$3.00	$5.00	$12.00

*No. 2 cutter with 3 cutting wheels can be furnished on order. Capacity ¾-inch to 2-inch pipe. List. each $6.00.

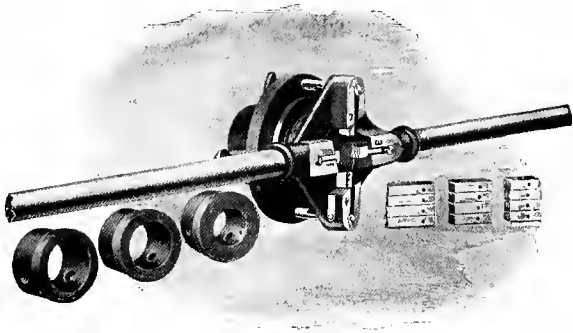
TOLEDO PIPE VISES

No. 1—Capacity ⅛ to 2½-inch pipe, list $10.00
No. 2—Capacity ⅛ to 4½-inch pipe, list 20.00

TOLEDO PIPE CUTTERS

Capacity, 2½ to 6-inch pipe, inclusive. List price, complete with ratchet handle, $80.00.

TOLEDO PIPE THREADING TOOLS



ADJUSTABLE THREADING DEVICE NO. 1

In principle all Toledo Pipe Threading Devices are practically the same. In all but Nos. 0 and 10 the dies recede against the taper pin or post while the machine is in operation.

In the two exceptions the dies recede against a series of tapering steps.

With the No. 1 Threader one man can very readily thread 2-inch pipe, and with the larger sizes, Nos. 2, 3 and 4 which are geared machines, one man can thread up to 12-inch pipe.

No. 1A is the same as No. 1 except that it is equipped with a ratchet.

Nos. 2, 3 and 4 have ratchet handle.

By the use of these tools pipe can be threaded in corners and close places where it is not possible to use an ordinary machine.

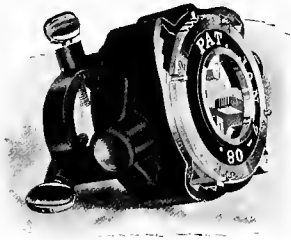
LIST PRICES COMPLETE WITH DIES

No. 1 —Capacity 1- to 2-inch pipe, inclusive, each	$ 24.00
No. 1A—Ratchet, Capacity 1- to 2-inch pipe, inclusive, each	30.00
No. 2 —Geared, Capacity 2½- to 4-inch pipe, inclusive, each	100.00
No. 3 —Geared, Capacity 4½- to 8-inch pipe, inclusive, each	300.00
No. 4 —Geared, Capacity 9- to 12-inch pipe, inclusive, each	500.00

LIST PRICES OF EXTRA DIES

No. 1 or No. 1A—Complete Set	$10.00
No. 1 or No. 1A—Single Set	2.50
No. 2—Complete Set	32.00
Single Set	8.00
No. 3—Complete Set	60.00
Single Set	12.00
No. 4—Complete Set	60.00
Single Set	20.00

TOLEDO PIPE THREADING TOOLS



ADJUSTABLE PIPE THREADING DEVICE NO. 10

These tools may be adjusted for threading several sizes of pipe with one set of dies.

These machines are so designed that they have no cams or intricate mechanism to slip or become clogged. They will thread pipe very easily because they embody the receding die principle.

Left hand dies for ½ and ¾-inch pipe can be furnished on special order with the No. 0 Machine—also left hand dies can be used in the No. 10 if ordered special—however, it requires a separate set of left hand dies for each size of pipe.

An extra set of dies is furnished with the No. 25, making it possible to always have a sharp set on hand.

LIST PRICES COMPLETE WITH DIES

No. 0 —Capacity ⅛ to ¾-inch pipe, inclusive, each	$16.00
No. 10 —Capacity 1 to 2-inch pipe, inclusive, each	28.00
No. 10A—Rachet—Capacity 1 to 2-inch pipe, inclusive, each	34.00
No. 25 —Geared—Capacity 2½ to 6-inch pipe, inc., each	230.00

LIST PRICE OF EXTRA DIES

No. 0—Complete Set Right Hand	$ 7.50
No. 0—Single Set Right Hand . .	2.50
No. 0—Single Set Left Hand, ½ or ¾	2.50
No. 10 or 10A—Set Right Hand . .	2.75
No. 10 or 10A—Complete Set Left Hand	11.00
No. 10 or 10A—Single Set Left Hand .	2.75
No. 25—Set Right Hand . . .	8.00

STEEL TOOL CHESTS

MADE from $\frac{1}{16}$-inch cold rolled steel with malleable iron corner pieces and hardwood braces; fitted with heavy wrought iron hinges and hasps. Each steel chest is furnished with a first-class lock and two keys and bolts to screw down cover at front corners.

Number	Depth Inches	Width Inches	Length Inches	Description	Weight Pounds	List
711	11	12	24	One drawer	60	$12.50
712	14	15	30	One drawer	95	17.00
713	16	17	36	One drawer	125	19.00
721	11	12	24	Two drawers	65	14.00
722	14	15	30	Two drawers	100	18.50
723	16	17	36	Two drawers	130	20.50
701	11	12	30	Without drawer	70	12.50
702	11	12	36	Without drawer	105	15.00
703	11	12	42	Without drawer	140	17.00
704	11	12	48	Without drawer	180	20.00

WOOD TOOL CHESTS

MADE of selected seasoned lumber throughout. All corners protected by heavy iron. Stationary till at one side for small tools. No. 789 has strong spring lock while No. 790 has two heavy hasps for padlock.

Number	Depth Inches	Width Inches	Length Inches	Weight Pounds	List
789	12	16	24	50	$12.50
790	12	16	36	60	18.50

CAPITOL AUXILIARY HEATERS

THESE cast-iron heaters are a perfect substitute for the old style pipe coils formerly placed in the combustion chamber for heating water for domestic purposes. They have a greater efficiency by reason of the divided circulation than is possible in any other form and at the same time do not interfere with the draft.

Can be used in furnaces and stoves for heating rooms out of reach of hot air pipes; for heating range boilers, heating water by steam, also for superheating steam and heating compressed air.

Made in iron and brass. When iron rust in hot water is to be avoided, we recommend the use of the brass section.

All sizes, except the 5", can be furnished with side inlets at an addition of $2.00 to list prices for the 6" and 8" sizes and $3.00 to list prices for all other sizes.

Size Inches	Height Inches	Tapping Inches	Capacity Square Feet	Price List Iron	Price List Brass
5	3	1	30	$ 3.25	$ 8.50
6	3	1	35	3.60	9.00
8	4½	1¼	75	7.00	22.00
12	6	2	125	9.60	45.50
14	7¼	2½	200	16.00	81.00
16	7	3	300	18.00	87.00
20	8	3½	500	30.00	156.00

CAPITOL WATER-BACK

Used in square sectional boilers for heating water for domestic purposes.

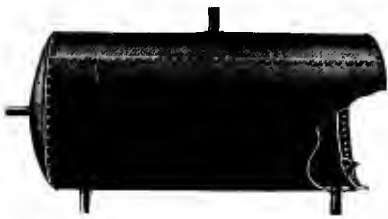
Arranged with proper openings for flow and return pipes. Made of cast iron.

Tapped ¾-inch for flow and return, measuring $2\frac{7}{16}$ inches on centers. Also tapped ½-inch for drain.

Width, 3¾ inches; length, 14 inches; capacity, 40 gallons; list, $10.00.

STANDARD STEEL STORAGE TANKS

with or without coils



Shows horizontal tank with location of regular tappings. The size and style of tapping can be varied to meet all special conditions.

DATA

All list prices on storage tanks herein include regular tappings.

Regular tappings consist of five 2″ reinforced tapped openings.

All tappings (reinforced or with flanges) more than five 2″ reinforced, will be charged as extra.

Tanks without manhole have the heads therein placed convex and concave.

Tanks with manhole have both heads placed convex.

Orders for tanks of special construction, or tanks furnished with coils, are not subject to cancellation.

When ordering, state whether vertical or horizontal tanks are wanted. Unless otherwise ordered, tanks without coils, manholes or handholes will be shipped. We recommend that tanks containing coils also have manhole placed in head.

All standard tanks are tested to 100 pounds hydrostatic pressure, and guaranteed for water storage purposes at working pressure not to exceed 65 pounds.

Prices of special tanks furnished on application.

Tanks used in water systems where a sudden or unusual pressure may occur beyond the 65 pounds working pressure indicated above, should be fitted with pressure reducing valve.

Tank Legs (set of three), list $3.00

BLACK STEEL STORAGE TANKS

Standard and Extra Heavy

List Prices

Size Inches	Capacity Gallons	Standard Shell 3/16"; Heads 1/4"		Extra Heavy Shell 1/4"; Heads 5/16"	
		Approximate Weight lbs.	List Price	Approximate Weight lbs.	List Price
18 x 36	40	200	$41.00	260	$45.00
18 x 48	53	250	45.00	315	50.00
18 x 60	66	290	49.00	370	55.00
18 x 72	79	330	54.00	420	61.00
18 x 84	92	370	58.00	470	66.50
18 x 96	106	410	62.00	525	72.00
20 x 48	65	275	47.00	350	53.00
20 x 60	82	320	51.00	400	58.00
20 x 72	98	360	55.00	460	63.00
24 x 36	71	280	46.00	350	52.00
24 x 42	82	300	49.00	390	54.00
24 x 48	94	335	52.00	425	58.50
24 x 60	117	390	57.00	495	65.00
24 x 72	141	440	62.00	565	71.00
24 x 84	164	500	68.00	650	80.00
24 x 96	188	550	74.00	720	86.00
24 x 108	212	600	80.00	790	92.00
24 x 120	235	660	86.00	860	98.00
30 x 36	110	365	56.00	460	63.00
30 x 48	147	430	61.00	550	70.00
30 x 60	184	495	67.50	635	77.00
30 x 72	221	560	73.00	720	84.00
30 x 84	258	640	81.00	825	95.00
30 x 96	294	700	88.50	915	103.00
30 x 108	335	770	96.00	1000	111.00
30 x 120	372	840	103.50	1090	119.00
36 x 36	159	560	69.00	580	77.00
36 x 48	212	540	75.50	685	86.00
36 x 60	265	615	83.00	790	95.00
36 x 72	318	690	90.50	890	104.00
36 x 84	371	780	100.50	1010	116.00
36 x 96	424	860	109.00	1110	126.00
36 x 108	477	950	117.50	1215	136.00
36 x 120	530	1020	126.00	1325	146.00
42 x 60	360	740	103.00	950	118.00
42 x 72	432	835	112.05	1070	128.50
42 x 84	504	925	122.00	1195	139.00
42 x 96	572	1020	132.00	1315	150.00
42 x 108	644	1120	142.00	1455	161.00
42 x 120	716	1225	153.00	1575	172.00
42 x 144	860	1425	175.00	1810	194.00

COILS FOR STORAGE TANKS

We can, upon special order, equip Tanks with return bend coils at extra charge, as per list below. Size of coil must be determined by heating-contractor, who alone is familiar with all the conditions surrounding installation.

List Prices

Prices are **per lineal foot** and include necessary return bends and lock nuts, and provide for placing coil in tank, properly braced and secured.

Coil made of	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
Black iron pipe with black return bends and lock nuts..	$ .50	$ .60	$ .65	$ .85	$1.30	$1.90	$2.70	$3.50
Galvanized iron pipe with galv. return bends and lock nuts..	.60	.70	.80	1.10	1.80	2.70	3.50	4.50
Brass (iron pipe size) pipe with brass return bends and lock nuts.....	1.50	2.15	2.60	3.50	6.00	8.50	11.00	14.00
Tinned brass (iron pipe size) pipe with tinned brass return bends and lock nuts.....	1.90	2.70	3.40	4.75	7.00	9.50	12.00	15.00
Copper (iron pipe size) pipe with tinned brass return bends and lock nuts.....	1.95	2.80	3.50	5.00				
Weight per lineal foot pounds..	2.00	2.91	3.49	4.93	8.03	10.06	12.05	15.00

A standard coil is one constructed with Return Bends and made of four pipes, the lineal feet being as follows (including Return Bends for the various lengths of tanks).

Tank— 48 inches long, 14 lineal feet
Tank— 60 inches long, 18 lineal feet
Tank— 72 inches long, 22 lineal feet
Tank— 84 inches long, 26 lineal feet
Tank— 96 inches long, 30 lineal feet
Tank—108 inches long, 34 lineal feet
Tank—120 inches long, 38 lineal feet

We recommend 1 -inch Pipe on Tanks of 20 and 22 inches diameter.
We recommend 1¼-inch Pipe on Tanks of 24 and 30 inches diameter.
We recommend 1½-inch Pipe on Tanks of 36 inches diameter.
We recommend 2 -inch Pipe on Tanks of 42 and 48 inches diameter.

PRICE LIST OF MANHOLES

	Each
Manhole in shell or head 16" x 22".....	$30.00
Manhole in shell or head 11" x 16".....	20.00
Manhole in shell or head 10½" x 14½".....	15.00
Handhole 3¼" x 4½".....	5.00
Cast Iron Legs.....	1.25

It is advisable to have a manhole in head of all tanks containing coils. This should be remembered when figuring. Quotations will upon application be promptly furnished on styles and sizes of coils other than above.

ASBESTOS PLASTIC CEMENT

FOR BOILERS, FURNACES, HEATERS, TANKS, ETC.

THIS cement is equal to any other on the market. It is white and of lighter weight than ordinary asbestos cement felting, and is consequently a most perfect non-conductor of heat. The material is pure asbestos fibre, mixed with other high-grade fireproof insulating ingredients. It should be mixed to the consistency of ordinary mortar at least twenty-four hours before using. If properly applied, 150 pounds should cover 40 square feet of surface to the depth of one inch. The cement is put up in 50, 75 and 100-pound bags.

Price per 100 pounds . $3.50

ASBESTOS BOILER PUTTY

Especially adapted for sealing openings in stoves and cast-iron boilers and as a protection for surfaces exposed to a direct fire.

Will not shrink or become porous.

5-lb. cans, per lb. list,	$0.15	25-lb. cans, per lb. list,	$0.10
10-lb. cans, per lb. list,	.12	50-lb. cans, per lb. list,	.08

CAPITOL SECTIONAL COVERINGS

Air Cell

Wool Felt

AIR CELL

For high or low pressure steam and hot water pipes our special Asbestos Air-Cell Pipe Covering is absolutely dependable.

It is a perfect insulator, light in weight, yet as strong and durable as any situation could demand. It will not disintegrate from the action of heat, however extreme, and complete satisfaction is guaranteed.

Made in 3-foot lengths; ½, ¾ and 1-inch thickness.

WOOL FELT

This covering is composed of a special wool felt, an interlining of pure asbestos felt, heavy canvas outside and finished with brass lacquered metal bands.

Not only is this covering a highly efficient insulating material, but it presents a handsome appearance, very suitable especially for covering pipes exposed to view.

This covering is made in 1-inch, ¾-inch and ½-inch thicknesses to fit all standard sized pipes. Made in 3-foot lengths.

MOULDED ASBESTOS

FOR HIGH AND LOW PRESSURE STEAM

Is a covering made of the best non-conducting materials known, being a composition of magnesia, asbestos and the necessary binding materials. It is light in weight, tough and non-combustible.

For list prices on coverings, see opposite page.

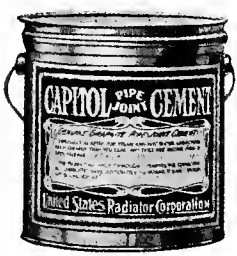
CAPITOL SECTIONAL COVERINGS

PRICE LIST

Inside Diameter of Pipe Inches	Price per Lineal Foot	Elbows Each	Tees Each	Globe Valves Each
½	$0.22	$0.30	$0.36	$0.54
¾	.24	.30	.36	.54
1	.27	.30	.36	.54
1¼	.30	.30	.36	.54
1½	.33	.30	.36	.54
2	.36	.36	.42	.60
2½	.40	.42	.48	.78
3	.45	.48	.54	.96
3½	.50	.54	.60	1.20
4	.60	.60	.75	1.50
4½	.65	.72	.90	1.85
5	.70	.90	1.20	2.25
6	.80	1.30	1.60	2.80
7	1.00	1.80	2.20	3.60
8	1.10	2.40	3.00	4.40
9	1.20	3.00	3.80	5.30
10	1.30	3.60	4.60	6.20

CAPITOL PIPE JOINT CEMENT

CAPITOL Pipe Joint Cement solves the problem of making positively air-tight joints. It is cheaper than red or white lead, and much superior. The joints can be very easily broken after long service without injury to the threads or pipe. Money, time and trouble will be saved by using this cement on all steam and hot water connections.



1-lb. cans, each . .	$0.60	12½-lb. cans, each	$4.50
5-lb. cans, each . .	2.25	25 -lb. cans, each .	7.50

Special prices quoted on full barrel lots.

BOILER REPAIRS

INDEX

For the convenience of our customers we give herein a price list of parts for the active lines of United States Boilers as listed in discount sheet of July 12th, 1915, together with several series of the non-active boilers.

Prices on repairs for the obsolete series of boilers, formerly made by the constituent companies of this Corporation, will be promptly given upon application.

In some instances changes have been made in parts of boilers and it is therefore very essential that the factory number appearing on front of boiler be given.

To assist us in giving prompt service we request that the following detailed information be sent with all repair orders:

1. Name and description of part wanted.
2. Boiler—round or square.
3. Pattern number cast on part.
4. Size number and factory number of boiler, both of which will be found either cast on the front or on brass plate screwed on front.
5. Date of original purchase.
6. Name of dealer of whom original purchase was made.
7. If impossible to give above information a sketch with dimensions marked on same should accompany order.
8. The following information will also be of assistance in making shipment.

If a square boiler, what is width of boiler section across widest part at front? What is total height from bottom of boiler base to top of supply tapping? How many grate bars in boiler? What is the length of grate bars? Are grate bars connected by a bolt and nut or by hook cast in bar?

If a round boiler, how many grate bars in set? What is extreme length of center grate bar? Are grate bars connected by a bolt and nut or by hook cast in bar? If boiler has triangular grate bars, are they hung in a separate ring on base or by small, loose hangers? Does the grate have a center rest underneath?

When ordering repair parts send orders to our nearest Branch Office

BRANCH OFFICES:

New York	Buffalo	Boston	Cleveland
Philadelphia	Minneapolis	Pittsburgh	St. Louis
Kansas City	Omaha	Chicago	Detroit

CAPITOL WINCHESTER

NAMES OF PARTS	SERIES NUMBER					
	3100 4100	3200 4200	3300 4300	3400 4400	3500 4500	3600 4600
Base, O. S. or N. S.,	$10.75	$10.75	$12.00	$17.75	$22.50	$28.50
Base Plate Front, O. S. or N. S.	1.50	1.60	1.75	2.65	3.50	3.75
Base Plate Front, Pres. Style	1.70	1.75	1.90	2.75	3.50	.....
Ash Pit Door, Pres. Style	2.00	2.35	2.80	3.60	3.90	.....
Ash Pit Door, O. S. or N. S.	2.00	2.20	2.40	3.00	3.20	3.80
Clinker Door for Triangular Grate	1.10	1.10	1.20	1.30	1.60	1.60
Clinker Door for Basket Grate, O. S. or N. S.	1.10	1.10	1.20	1.40	1.80	.....
Shaker Door, Basket Grate	.40	.40	.40	.40	.40	.....
Ash Pit Door Hinge Pin	.30	.30	.40	.40	.40	.40
Draft Door	.40	.40	.40	.50	.60	.80
Draft Door Frame	.40	.40	.40	.50	.50	.60
Draft Door Ratchet	.30	.30	.30	.30	.30	.30
Basket Grate Ring	1.25	1.25	2.20	3.00	4.50	.....
Basket Grate Ring, Pres. Style	1.35	1.40	2 25	3.00	4.50	.....
Basket Grate Bar, short	1.15	1.40	1.50	1.90	3.00	.....
Basket Grate Bar, long	1.25	1.65	1.65	2.10	3.30	.....
Basket Grate Link	.30	.30	.30	.30	.30	.....
Basket Grate Frame	1.75	1.75	1.85	2.40	3.00	.....
Basket Grate Frame Cap	.30	.30	.30	.30	.30	.....
Basket Grate Yoke, O. S.	.30	.30	.30	.40	.40	.....
Ball Bearings, per set (three)	.50	.50	.50	.50	.50	.....
Grate Ring Shaker Handle	.40	.40	.40	.50	.50	.....
Grate Ring Shaker Handle, vertical	.75	.75	.75	.75	.75	.....
Dumping Handle	.60	.60	.60	.60	.60	.....
Eye Winker Basket Grate, Pres. Style	.30	.30	.30	.30	.30	.....
Connecting Rods, Basket Grate, Pres. Style	.50	.50	.50	.50	.50	.....
Hook Bolts, pair, Pres. Style	.30	.30	.30	.30	.30	.....
Basket Grate, complete	4.75	5.40	6.45	8.10	11.90	.....
Basket Grate, complete, Pres. Style	8.75	9.35	10.40	12.55	16.95	.....
Base, complete with Basket Grate	25.25	26.20	31.15	39.50	49.80	.....
Base, complete, Basket Grate, Pres. Style	24.60	25.70	28.60	38.45	48.85	.....
Triangular Grate Bar	.70	.80	.90	1.00	1.20	2.10
Triangular Grate Frame	2.60	3.20	3.80	5.70	6.60	9.80
Triangular Grate Cap	.30	.30	.30	.40	.40	.40
Triangular Grate Gear	.30	.30	.30	.30	.30	.40
Eye Winker for Triangular Grate	.30	.30	.30	.30	.30	.30
Shaker Handle for Tri. Grate	.60	.60	.60	.60	.60	.60
Triangular Grate, complete	8.10	8.30	11.00	15.40	19.50	25.50
Base, com. with Tri. Grate	24.85	25.35	29.85	41.80	52.50	63.15
Fire Pot	25.00	30.00	36.50	42 50	51.50	56.00
Fire Door, flat, O. S.	.80	.80	1.00	1 20	1.50	.....
Fire Door Frame, flat, O. S.	1.20	1.50	2 00	2 25	2.40	.....
Fire Door, curved	1.25	1.25	2 00	2.00	2.25	2 25
Fire Door Frame, curved	1.75	1.90	2.00	2.50	2.50	2 75
Fire Door Lining, flat, O. S.	.40	.40	.80	.80	1.00	.....
Fire Door Lining, curved	.50	.50	1.00	1.00	1.25	1.50
Fire Door Slide, straight	.30	.30	.30	.30	.30	.30

CAPITOL WINCHESTER

Names of Parts	Series Number					
	3100 4100	3200 4200	3300 4300	3400 4400	3500 4500	3600 4600
Fire Door Slide, Curved	$0.30	$0.30	$0.30	$0.30	$0.30	$0.30
Center Flue Intermediate Ring	5.00	6.00	9.00	12.00	13.75	18.50
Outer Flue Intermediate Ring	5.50	7.00	9.00	11.00	14.00	18.50
Cleanout Door, Flat, O. S	.30	.40	.40	.40	.40	. .
Cleanout Door, Curved	.40	.40	.50	.60	.60	.70
Cleanout Door Frame, O. S.	.60	.60	.80	.80	1.00	. .
Cleanout Door Frame, Curved	.60	.70	.80	1.20	1.30	1.50
Cleanout Door Frame on Dome, Curved	.60	.70	.80	1.20	1.30	1.50
Dome, Steam	9.50	11.50	14.50	19.00	23.00	30.00
Dome, Water	5.50	6.00	8.50	11.00	13.00	17.50
Smoke Ell, R. H. (Half)	1.00	1.00	1.10	1.60	2.10	2.50
Smoke Ell, L. H. (Half)	1.00	1.00	1.10	1.60	2.10	2.50
Smoke Hood, Complete	3.50	3.50	3.80	4.80	5.90	6.80
Check Door	.30	.30	.40	.40	.50	.60
Check Door Ratchet	.30	.30	.30	.30	.30	.30
Damper	.30	.30	.30	.30	.30	.30
Damper Handle	.30	.30	.30	.30	.30	.30
Damper Handle Ratchet	.30	.30	.30	.30	.30	.30
Water Column	1.50	1.50	1.50	1.50	1.50	1.50
Water Column Pipe Connections	1.00	1.00	1.00	1.00	1.00	1.00
Diaphragm	3.00	3.00	3.00	3.00	3.00	3.00
Diaphragm Lever	.30	.30	.30	.30	.30	.30
Diaphragm Plunger	.30	.30	.30	.30	.30	.30
Diaphragm Weight	.30	.30	.30	.30	.30	.30
Diaphragm Rubber	1.00	1.00	1.00	1.00	1.00	1.00
Diaphragm Complete	5.10	5.10	5.10	5.10	5.10	5.10
Steam Trimmings Complete	8.75	8.75	8.75	8.75	8.75	8.75
Push Nipple	.40	.40	.40	.40	.60	.60
Number Plate	N. C.	N. C.	N. C.	N. C.	N. C.	N. C.
Section Connecting Bolt	.40	.40	.40	.40	.50	.60
Hoe	.	.	.50	.50	.50	.50
Poker	.50	.50	.50	.50	.50	.50
Flue Scraper	.50	.50	.50	.50	.50	.50
Number of Bars for Triangular Grate	Three	Three	Four	Five	Six	Five

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

Series numbers 1100 and 2100—1200 and 2200—1300 and 2300—1400 and 2400—1500 and 2500—1600 and 2600 are the same as above series respectively.

SUNRAY SQUARE SECTIONAL
50E, 90A, 320, 230, and WN270 Series

Names of Parts	Series Number				
	50E	90A	320	230	WN270
Front Section	$24.20	$30.60	$51.30	$52.00	
Plain Middle Section	18.20	26.80	41.80	49.00	
Plain Middle Section, Tapped	18.60	26.80	42.20	51.00	
Middle Next Back	18.10			46.00	
Next Back Section, Tapped	18.40			47.00	
Bridge Wall Section			49.50		
Back Section	25.90	34.90	47.80	57.00	
Front Section R. or L.					46.40
Plain Middle Section R. or L.					49.00
Plain Middle Section Tapped, R. or L.					49.30
Middle Next Back Sec., Tapped, L.H.					48.30
Middle Next Back Sec., Plain; R. H..					47.60
Middle Section, Tapped ¾"					49.30
Back Section, R. or L.					54.00
Strip Closing					.80
Ashpit Door	2.35	2.35	3.15	2.75	3.15
Ashpit Flap Door	.30	.30	.65	.75	.75
Ashpit Flap Door, N. S.				.30	
Ashpit Door Slide	.30	.30	.30	.30	.30
Ashpit Door Handle	.30	.30	.30	.30	.30
Ashpit Door Catch	N. C.	N. C.	N. C.	N. C.	N. C.
Base Front	1.70	2.40	2.95	5.75	10.15
Base Back	2.30	2.50	3.80	3.45	7.40
Base Back Covering Plate	.30	.35	.35	.35	.90
Base Back Plate Catch	N. C.	N. C.	N. C.		.30
Back Corrugated Plate			4.10		
Back Plain Plate			5.60		
Base Side, Blank, 1 Extension			1.05	1.05	2.10
Base Side, Blank, 2 Extension		1.60	1.60	2.40	4.50
Base Side, Blank, 3 Extension				3.70	6.10
Base Side, Blank, 4 Extension	3.15	3.20		4.50	8.50
Base Side, Blank, 5 Extension	4.15	3.50			10.15
Base Side, Blank, 6 Extension	4.65	4.45	4.50		
Base Side, Blank, 7 Extension	5.30	4.90	5.20		
Base Side, Blank, 8 Extension	6.20	6.50	6.00		
Base Side, Blank, 9 Extension	7.30	7.10	6.80		
Base Side, Blank, 10 Extension			8.00		
Base Side Plate Draft Opening 4 Section	2.85			3.70	
Base Side Plate Draft Opening 5 Section	4.00				8.30
Base Side Plate Draft Opening 6 Section	4.35				
Base Side Plate Draft Opening 7 Section	5.45				

When ordering parts it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

SUNRAY SQUARE SECTIONAL
Continued

Name of Parts	Series Number				
	50E	90A	320	230	WN270
Base Side Plate Draft Opening 8 Section	$ 6.00				
Base Side Plate Draft Opening 9 Section	7.20				
Base Side Draft Door	.35			$0.70	$ 1.25
Base Side Draft Door Frame	.75			1.90	4 60
Grate, Middle	.90	$ 1.75	$ 2.30	3.20	6.00
Grate, One-half Stationary	.60	.80	1.90	1.20	2.20
Grate Rest per Section		.25	.25		
Grate Lock				.30	.30
Short Connecting Bar	.30	.30	.30	.50	.60
Long Connecting Bar per Grate	.20	.20	.20	.30	.30
Front Short Connecting Bar	.30		.30	.50	
Shaker Shank	.35	.35	.30	.90	1.20
Shaker Fulcrum	.30	.30	.30	.40	.50
Shaker Handle	.50	.50	.50	.50	.50
Fire Door	1.50	2.20	2.25	2.25	
Fire Door Frame	2.85	2.65	2.15		1.90
Fire Door, R. or L.					2.50
Fire Door Liner, R. or L.					.70
Fire Door Liner	1.00	1.00	.85	1.00	
Fire Door Wheel	.30	.30	.30	.30	.30
Fire Door Catch				N. C.	N. C.
Fire Door Handle	.30	.30	.30	.30	.30
Fire Door Hinge Plate				.50	.50
Clinker Door, R. or L.				.50	.65
Clinker Door Liner, R. or L.				.40	.50
Clinker Door Handle				.30	.30
Cleanout Door	2.40	2.75			
Cleanout Door Frame	2.40	2.40			
Cleanout Door Liner	1.50	1.25	1.40		
Cleanout Door, Large R. or L.			2.50	1.80	6.00
Cleanout Door, Small R. or L.					1.65
Cleanout Door Liner, Small R. or L.					.75
Cleanout Door Hinge Plate, Large				.50	.50
Cleanout Door Hinge Plate, Small				.40	.40
Cleanout Door Handle	.30	.30	.30	.30	.30
Cleanout Door Catch		N. C.	N. C.	N. C.	N. C.
Hing Pin Knob	N. C.	N. C.	N. C.	N. C.	N. C.
Baffle Plate Front					.60
Baffle Plate, R. H. or L. H., O. S.		.30			
Smoke Box Blank (Half)	2.25	3.00		3.00	7.20

When ordering repairs It is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

SUNRAY SQUARE SECTIONAL
Continued

Name of Parts	Series Number				
	50E	90A	320	230	WN270
Smoke Box with Check Opening	$2.15	$2.70	$9.00	$2.70	$7.00
Smoke Box Check Frame	.	.	.60	.70	.
Smoke Box Lid	.30	.35	.35	.35	.80
Smoke Box Damper	.50	.75	1.00	.75	3.25
Smoke Box Damper Connection	.30	.30	.30	.30	.30
Smoke Box Damper Handle	.	N. C.	N. C.	N. C.	1.30
Smoke Box Cap	.	1.85	.	1.80	.
Smoke Box Collar 10" or 12"	.	1.20	.	.	.
Smoke Box Segment Guage Fulcrum	.30	.30	.30	.30	.30
Smoke Box Segment Gauge	.30	.30	.30	.30	.30
Smoke Box Segment Gauge Catch	.30	.30	.30	.30	.30
Smoke Hood Complete	6.40	11.05	12 15	10.50	20.75
Indirect Damper	.75	1.10	1.90	.	.
Water Column	.	.	.	3.50	3 50
Water Column Connection	.	.	.	2.00	2.00
Diaphragm	3.00	3.00	3.00	3.00	3.00
Diaphragm Lever	.30	.30	.30	.50	50
Diaphragm Weight, Large	.	.	.50	.50	.50
Diaphragm Weight, Small	.40	.40	.40	.40	.40
Diaphragm Connectlng Pipe	.30	.30	.30	.40	.40
Diaphragm Rubber	1.00	1.00	1.00	1.00	1.25
Diaphragm Complete	5.00	5.00	5.50	5.80	6.05
Steam Trimmings Complete	8.75	8 75	10.00	10 00	12 00
Number Plate	N. C.	N. C.	N. C.	N. C.	N. C.
Name Plate	.30	.30	.30	.30	1.00
Nipple 4"—C. I.			.	.50	.50
Nipple 5¼"—C. I.	.	.	.	.60	.60
Nipple 3"—Steel	.30	.30	.30		
Nipple 4"—Steel	.	.	.30	.	.
Washer, Large, Square	.	.	.	.75	.75
Washer, Oval	.	.	.	.40	.40
Washer, Medium per ½ doz.	30	.30	.30	.30	.30
Washer, 2½" per ¼ doz.	.	.	.	.30	.30
Washer. 2" per ½ doz.	.	.	.	.30	.30
Washer, Small per ½ doz.	.30	.30	.30	.30	.
Washer. Large	30	.30	.30	.	.
Thumb Screw	N. C.	N. C.	N. C.	N. C.	N. C.
Thumb Latch	N. C.	N. C.	N. C.	N. C.	N. C.
Set 4 Tie Rods 4 Secs.	.70	.	.	.	.
Set 4 Tie Rods 5 Secs.	.90	1.00	.	1.20	.

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

SUNRAY SQUARE SECTIONAL
Continued

Names of Parts	Series Number				
	50E	90A	320	230	WN270
Set 4 Tie Rods 6 Secs.	$1.00	$1.10	$1.20	$1.40	$2.00
Set 4 Tie Rods 7 Secs.	1.20	1.30	1.30	1.60	2.25
Set 4 Tie Rods 8 Secs.	. .	1.40	1.40	1.80	2.50
Set 4 Tie Rods 9 Secs.	. .	1.60	1.60	2.00	2.90
Set 4 Tie Rods 10 Secs.	. .	.	. .	2.20	3.20
Set 4 Tie Rods 11 Secs.	. .	. .	. .	. .	3.50
Set 4 Tie Rods 12 Secs.	. .	. .	. .	. .	3.80
Hoe	.50	.50	.50	1.00	1.25
Poker	.50	.50	.50	1.25	1.50
Flue Brush	.75	.75	.75	1.00	1.20
Flue Brush Handle	.40	.40	.40	.60	.60

The 50-E Series has three connecting Rods in Set.

The 50-E Series has one less middle grate bar, than number of sections and a front and rear half bar.

The 90A and 320 Series have two less intermediate grate-bars than number of sections and a front and rear half bar. The 230 and WN270 Series have one less intermediate grate bar than number of sections and a front half bar.

NOTE—20-inch grate.

50A, 50B and 550 Series Sunray same as 50E Series except grates and Shaker attachments. 500 and 530 Series same as above except having plate front and back. 20 Series Sun same as 50-E Series Sunray.

24-inch grate.

70 Series Sunray (without 1904) same as 90A Series except having plate front and back. 70 Series (with 1904) same, with water front and back. C. O. doors same but fire door larger on plate front.

90 and 90A Series are the same except latter has double shake over six sections.

24 and 24-B Series Sun same as 90 and 90A Series Sunray.

32-inch grate.

80 Series Sunray (without 1904) same as 320 Series except having plate front and back. 80 Series (with 1904) same, with water front and back. C. O. doors same but fire door larger on plate front. 800 Series same as 80 Series dated 1904, also same as 320 series except slight difference in intermediate section, although interchangeable.

32B Series Sun same as 800 Series Sunray.

32 Series Sun same as 320 Series Sunray.

Letters found with size numbers of Sunray Boilers indicate some change and should always be given when ordering repairs.

See Notes, page 158, when ordering

FURMAN SQUARE SECTIONAL

Name of Parts	Series Number				
	180	220	G270 270	330	380
Front Section	$20.80	$28.20	$37.10	$46.30	$81.20
Reg. Intermediate Section	19.70	27.40	37.00	42.20	74.20
Special Tapped Section next front	18.80	27.40	35.30	42.50	70.90
Special No-Tap Section					70.90
Reg. Intermediate Section Tapped	20.40	27.80	37.50	42.80	73.70
Back Section	22.50	30.90	43.80	50.20	91.10
Front Base Plate	1.45	1.75	2.40	3.00	5.35
Front Base Plate, N. S.				3.00	
Side Base Plate with Draft Opening					5.65
Side Base Plate (1 grate)	.75	.75	.85	.85	1.50
Side Base Plate (2 grate)	1.90	1.90	2.60	2.55	3.15
Side Base Plate (3 grate)				3.50	4.15
Side Base Plate (4 grate)	2.80	2.80	4.00	4.75	5.90
Corner Base Plates					1.15
Back Base Plate	1.80	2.45	3.00	4.35	4.35
Back Base Plate, covering plate					.90
Base Plate Cap open	.30	.30	.30	.30	.30
Base Plate Cap closed			.30	.30	.30
Connecting Bar Guides on Bases over 4 Grates	.30	.30	.30	.30	.30
Ash pit door	1.00	1.00	1.15		1.75
Ash pit door, O. S. or N. S.				1.25	
Draft Door (New Style)				.90	
Draft Door	.40	.40	.40	.40	1.00
Draft Door Ratchet	.30	.30	.30	.30	.30
Draft Door on base side					1.25
Grate Bar, Front or Rear half	.40	.50	.70	.85	.90
Grate Bar, Intermediate	.90	1 30	1.50	1.90	5.10
Grate Bar, Intermediate, New Style				3.00	
Base Grate Lug	.30	.30	.30	.30	
Base Front Connecting Bar	.30	.30	.40	.40	.60
Connecting Bar (2 grate)	.40	.30			
Connecting Bar (3 grate)	.40	.40	.40		
Connecting Bar (4 grate)	.50	.50		.60	
Connecting Bar (3 grate) N. S.				.50	.50
Connecting Bar (4 grate) N. S.				.60	.60
Connecting Bar (5 grate) N. S.				.80	.80

All above Series have two less grate bars than number sections and a front and rear half stationary bar.

The entire front section and all parts on front of boiler as well as grates and connecting bars were changed January 1st, 1911, on 330 Series. A change also made from solid door lugs and catches to loose pattern on 270 and 330 Series.

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

FURMAN SQUARE SECTIONAL
Continued

Name of Parts	Series Number				
	180	220	G270 270	330	380
Connecting Bar, 1 grate (extension)	$0.30	$0.30	$0.30	$0.30	. .
Connecting Bar, 2 grate (extension)	.30	.30	.30	.30	.
Connecting Bar, 3 grate (extension)	.	.	.40	.40	. .
Shaker Handle	.60	.60	.75	75	$1.10
Fire Door	1.00	1.10	1.15	1.75	2.25
Fire Door Lining	.70	.75	.90	1.25	1.70
Fire Door Damper Wheel	.30	.30	.30	.30	.30
Fire Door Hinge Lugs	. .	. .	.30	.30	. .
Fire Door, N. S.	.	. .	. .	2.00	. .
Fire Door Lining, N. S.	. .		. .	1.25	. .
Fire Door Frame, N. S.	. .	. .	. .	1.50	. .
Clinker Door	.60	.60	.60	.90	1.00
Clinker Door Lining	.35	.40	.40	.40	.50
Clinker Door Plate	.65	.75	1.00	1.15	1.40
Clinker Door, N. S.	. .	. .	.	1.25	. .
Clinker Door Lining, N. S.	.	. .	. .	.50	. .
Clinker Door Frame, N. S.	. .	.	. .	1.25	. .
Clinker Door Plate N. S.	. .	. .	. .	1.25	. .
Clinker Door Hinge Lug	.	. .	.30	.30	. .
Cleanout Door, R. or L.	.75	.80	.80	1.40	1.00
Cleanout Door Lining, R. or L.	.35	.55	.55	1.15	.65
Cleanout Door, R. or L. (N. S.)	.		. .	1.00	. .
Cleanout Door Lining, R. or L. (N. S.)	. .	. .	. .	.50	.
Cleanout Door Frame, R. or L. (N. S.)	.	. .		1.15	1.00
Center Cleanout Door	.	. .	. .	.	1.70
Center Cleanout Door Lining		. .	. .		1.15
Center Cleanout Door Frame	.	.	.	.	1.70
Cleanout Door Lugs	. .	.	.30	.30	.
Door Catches	. .	.	.30	.30	. .
Smoke Ell, Right Hand	1.65	2.00	2.75	3.65	5.35
Smoke Ell, Left Hand	2.00	2.40	3.00	3.90	6.50
Smoke Ell Damper	.45	.50	.65	.85	1.75
Smoke Ell Complete	4.75	5.75	7.00	9 75	18.00
Smoke Ell Check Door	.30	.30	.30	.50	.50
Check Door Frame	.30	.50	.65	.65	.65
Check Door Ratchet	N. C.	N. C.	N. C.	N. C.	.
Smoke Box Cap	.	.	. .	.	2.60
Damper Rod	. .	.	.	.	30

All above Series have two less grate bars than number sections and a front and rear half stationary bar.

The entire front section and all parts on front of boilers as well as grates and connecting bars were changed January 1st, 1911, on 330 Series. A change also made from solid door lugs and catches to loose pattern on 270 and 330 Series.

When ordering repairs It is necessary that Serial Number and Size Number be given, as well as an accurate description of parts wanted.

See Notes, page 158. when ordering.

FURMAN SQUARE SECTIONAL
Continued

Name of Parts	Series Number				
	180	220	G270 270	330	380
Damper Rod Lever					$0.30
Back Damper Rod Clip					N. C.
Damper Connecting Rod					.50
Front Damper Gauge Clip					N. C.
Damper Adjustment Handle					N. C.
Damper Handle & Ratchet	$0.30	$0.30	$0.30	$0.30	
Coil Plate	.30	.30	.30	.30	.30
Baffle Plate	.30	.30	.30	.30	.30
Water Back	1.10	1.10	1.10	1.10	1.10
Water Bottle	1.00	1.00	1.00	1.00	1.00
Water Bottle Connections	.80	.80	.80	.80	.80
Water Column	1.20	1.20	1.20	1.20	1.20
Water Column Connections	1.50	1.50	1.50	1.75	2.00
Diaphragm	3.00	3.00	3.00	3.00	3.00
Diaphragm Lever	.30	.30	.30	.50	.50
Diaphragm Weight, Small	.30	.30	.30	.30	.30
Diaphragm Weight, Large	.50	.50	.50	.50	.50
Number Plate	N. C.	N. C.	N. C.	N. C.	N. C.
Diaphragm Complete	5.10	5.10	5.10	5.30	5.30
Diaphragm Rubber	1.00	1.00	1.00	1.00	1 00
Steam Trimmings Complete	8.75	8.75	8.75	10.00	12.00
2 Inch Push Nipple	.30				
3 Inch Push Nipple		.40			
4 Inch Push Nipple	.40	.40	.40	.40	.40
6 Inch Push Nipple			.60	.60	.60
4 Inch Draw Clamps, Each			1.00	1.00	1.00
6 Inch Draw Clamps, Each			1.50	1.50	1.50
Set 4 Tie Rods 4 Sec.	.80				
Set 4 Tie Rods 5 Sec.	1.00	1.00			
Set 4 Tie Rods 6 Sec.	1.10	1.10	1.30		
Set 4 Tie Rods 7 Sec.	1.30	1.30	1.30	1 30	2.25
Set 4 Tie Rods 8 Sec.		1.40	1.40	1.60	2.50
Set 4 Tie Rods 9 Sec.			1.60	1.90	2.90
Set 4 Tie Rods 10 Sec.				2.00	3.20
Set 4 Tie Rods 11 Sec.					3.50
Flue Brush	.60	.60	.60	.60	.60
Flue Brush Handle	.40	.40	.40	.40	.40
Poker	.50	.50	.50	.75	.75
Hoe	40	.40	40	60	.75

All above Series have two less grate bars than number sections and a front and rear half stationary bar.

The entire front section and all parts on front of boiler as well as grates and connecting bars were changed January 1st, 1911, on 330 Series. A change also made from solid door lugs and catches to loose pattern on 270 and 330 Series.

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

FURMAN ROUND SECTIONAL

Name of Parts	Series Number				
	16"	19"	22"	25"	29"
Base	$ 5.70	$ 6.30	$ 7.10	$ 8.95	$13.50
Front Base Plate	. .	1.20	1.40	1.70	. .
Front Base, Upper Half	.40		.		.90
Front Base, Lower Half	.45	.	.	.	1.80
Ash Pit Door	1.00	1.25	1.25	1.25	1.25
Draft Door	.40	.40	.40	.40	.40
Draft Door Ratchet	.30	.30	.30	.30	.30
Grate Bar Short, R. or L., O. S. or N. S.	.40	.45	.50	.45	.60
Grate Bar Short, Pres. S.		.75	.95	.80	1.10
Grate Bar Medium, R. or L., O. S. or N. S.				.70	.90
Grate Bar Medium, Pres. S.	.	.	.	1.10	1.25
Grate Bar Long, R. or L., O. S. or N. S.	.60	60	.80	.80	1.20
Grate Bar Long, Pres. S	. .	.90	1.10	1.20	1.35
Grate Bar Gear, O. S., N. S. or Pres. S.	.30	.30	.30	.30	.30
Grate Base Lug	.30	.	.	.	.
Grate Center Rest, Pres. S.	.	.		.50	.60
Grate Center Lugs, Pres. S.				.30	.30
Grate Center Rest Hanger	.	.	.	.30	.30
Grate Bar Washer, O. S. or N. S.	.30	.30	.30	.30	.30
Grate Ring, O. S. or N. S.	1.50	1.60	2.10	1.90	3.00
Grate Ring, Pres. S.	1.50	1.60	2.10	2.30	2.85
Grate Bar Hanger, O. S. or N. S.	.30	.30	.30	.30	.30
Back Hanger, Pres. S.	.	.45	.45	.65	.65
Gear Rack, Pres. S.		.60	.60	.75	.85
Gear Rack Lugs, Pres. S.		.30	.30	.30	.30
Grate Shaker Handle, O. S. or N. S. or Pres. S.	.50	.50	.50	.50	.50
Fire Pot	27.70	40.60	48.30	56.30	68.10
Clinker Door	.40	.40	.40	.40	.40
Clinker Door Frame	.50	.60	.60	.60	.60
Clinker Door Lining	.30	.30	.30	.30	.30
Fire Door	.60	.75	1.00	1.00	1.00
Fire Door Frame	1.00	1.20	1.20	1.20	1.20
Fire Door Lining	.40	.60	.60	.60	.60
Fire Door Wheel	.30	.30	.30	.30	.30
Intermediate Ring B	8.00	9 60	10.00	14.70	20.00
Intermediate Ring C	7.50	9.60	10.40	12.50	18.10
No Ring C. O. Door, O. S.	.30	.30	.30	.30	.30

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

FURMAN ROUND SECTIONAL
Continued

Name of Parts	Series Number 16"	19"	22"	25"	29"
No Ring C. O. Door Frame, O. S.	$0.40	$0.40	$0.50	$0.50	$0.50
One Ring C. O. Door, O. S.	.65	.65	.65	.65	.65
One Ring C. O. Door Frame, O. S.	.75	.75	.75	.75	.90
Two Ring C. O. Door, O. S.	.90	1.00	1.00	1.00	1.00
Two Ring C. O. Door Frame, O. S.	.90	1.00	1.00	1.00	1.00
Three Ring C. O. Door, O. S.					1.10
Three Ring C. O. Door Frame, O. S.					1.40
Cleanout Door, N. S.	.30	.30	.30	.30	.30
O-1-2 or 3 C. O. Door Frame N. S.	.50	.50	.50	.50	.50
Dome, Steam	13.40	18.70	21.30	25.30	34.50
Dome, Water	9.20	13.10	16.60	20.90	25.80
Smoke Ell.	1.30	1.50	1.90	2.75	3.45
Check Door	.30	.30	.30	.30	.30
Check Door Ratchet	N. C.	N. C.	N. C.	N. C.	N. C.
Damper	.35	.35	.60	.75	1.00
Damper Ratchet	.30	.30	.30	.30	.30
Damper Ratchet Handle	.30	.30	.30	.30	.30
Smoke Ell Complete	2.55	2.75	3.40	4.30	5.35
Smoke Box Clamps	.30	.30	.30	.30	.30
Smoke Box, O. S.		1.00	1.25	1.50	
Smoke Box Caps, O. S.		.30	.30	.30	
Smoke Box Damper, O. S.		.35	.40	.50	
Check Door, O. S.		.40	.50	.60	
Check Door Frame, O. S.		.30	.30	.30	
Smoke Box Complete, O. S.		3.75	4.25	4.70	
Hinge Pins	.30	.30	.30	.30	.30
Diaphragm, O. S.	3.00	3.00	3.00	3.00	3.00
Diaphragm, Pres. S.	3.00	3.00	3.00	3.00	3.00
Diaphragm Lever	.30	.30	.30	.30	.30
Diaphragm Plunger	.30	.30	.30	.30	.30
Diaphragm Weight, Small	.30	.30	.30	.30	.30
Diaphragm Weight, Large	.50	.50	.50	.50	.50
Diaphragm Rubber	1.00	1.00	1.00	1.00	1.00
Diaphragm Complete	5.10	5.10	5.10	5.10	5.10
Water Bottle	1.00	1.00	1.00	1.00	1.00
Water Bottle Connecting Pipe	1.50	1.50	1.50	1.50	1.50
Steam Trimmings Complete	8.75	8.75	8.75	8.75	8.75
Baffle Plate	.30	.30	.30	.30	.30
Push Nipples	.40	.60	.60	.60	.60

There are two long center bars which are shaker bars on all sizes, except 16-inch Series which has but one.

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

FURMAN ROUND SECTIONAL
Continued

Name of Parts	Series Number				
	16″	19″	22″	25″	29″
Number Plate	N. C.	N. C.	N. C.	N. C.	N. C.
Name Plate	N. C.	N. C.	N. C.	N. C.	N. C.
Section Connecting Rod	$0.40	$0.40	$0.50	$0.50	$.60
Hoe	.50	.50	.50	.50	.60
Poker	.50	.50	.50	.50	.50
Flue Scraper	.50	.50	.50	.50	.50

NOTE—16″ has 3 grate bars—19″ and 22″ have 4 bars—25″ and 29″ have 6 bars. Grate bars for Furman Rounds made in 3 styles known as 1st, "Old Style" (O. S.), 2nd, "New Style" (N. S.) and 3rd, "Present Style" (Pres. S.). "Old Style" has round keyed shank where gears are placed.

New Style has square shank — otherwise Old Style and New Style are same. The gear wheels for above styles have round or square holes to match.

Present Style are separate patterns.

A complete set of Old Style or New Style grate bars with proper gears can be used in old base but cannot be mixed.

Present Style bars can be used only with Present Style Base.

Approximately Round Boilers were shipped with grates as follows: 16″ Old Style only; 19″ Old Style to Serial No. 4036; New Style to No. 6750 and Present Style on all later numbers. 22″ Old Style to No. 3563; New Style to No. 6369 and Present Style on all later numbers.

25″ Old Style to Serial No. 3691; New Style to No. 6324, and Present Style to all later numbers. 29″ Old Style never furnished on this size. New Style to No. 6023 and Present Style on all later numbers.

The Present Style fire pot, domes and rings with large flue openings will be furnished on repair orders for Old Style boilers which had small round openings about 2½″ in diameter. 15″, 18″, 21″ 24″ and 28″ correspond to above respective sizes and represent old numbering system.

CAPITOL IMPROVED SQUARE SECTIONAL
25-37 and 48 Series A or B Styles

Size	Top Header	Cored Base	Sub-Base Side	Conn. Rod R.	Conn. Rod L.
425–1425	8.40	11 25	2.60	.50	....
525–1525	10.25	12 60	3.50	.60	.40
625–1625	12.10	14 10	4.40	.70	.50
725–1726	14.00	15 50	4 70	.80	.60
825–1825	15.60	17 00	5.40	.90	.70
537–1537	20.00	14 50	3.60	.90	.70
637–1637	24.25	16 50	4.75	1.00	.80
737–1737	28 50	18.50	5.10	1.10	.90
837–1837	32.75	20.50	5.85	1.20	1.00
937–1937	37.00	22.50	6.25	1.30	1.10
1037–2037	41.25	24 50	6 90	1.40	1.20
648–	52.00	26.25	6.20	1.20	.90
748–1748	60.00	29.25	6.40	1.40	1.10
848–1848	68.00	32.00	7 40	1 60	1 30
948–1948	76.25	34.75	7.60	1 80	1.50
1048–2048	84 50	37.50	8.75	2.00	1.70
1148–2148	92.50	40.00	9.40	2 20	1.90
1248–2248	100 00	43.00	11.00	2 40	2 10
1348–2348	109.00	46.00	12.60	2.60	2.30

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

CAPITOL IMPROVED SQUARE SECTIONAL

A or B Styles—Continued

Name of Parts	Series Number				
	25-A		25-B	37″	48″
	Steam	Water			
Front half section, R. or L.	$11.60	$10.70	$11.40	$21.60	$43.80
Intermediate half section, R. or L.	10.60	9.60	9.60	17.60	30.30
Flue half section, R. or L.	10.60	9.40	. .	17.10	30.00
Skeleton half section, R. or L.	9.10	7.80	8.70	14.20	24.10
Area half section, R. or L.	10.70	9.60	. .	17.50	30.30
Back half section, R. or L.	12.50	11.80	12.50	24 00	46.80
Ash Pit Front	4.50	4.50	4.50	5.75	. .
Ash Pit Front, R. or L.	. .	. .	. .	. .	5.75
Ash Pit Door	1.50	1.50	1.50	1.25	2.50
Ash Pit Door Frame	. .	. .	. .	. .	2.20
Ash Pit Drop Door or Butterfly Door	.50	.50	.50	.70	.90
Ash Pit Drop Door Ratchet	N. C.	N. C.	N. C.	N. C.	N. C.
Ash Pit Door Handle	.35	.36	.36	.35	.35
Front Distance Piece	.90	.90	.90	1.20	3.50
Sub-base End	2.40	2.40	2.40	3.50	4.20
Grate Bars, Coarse A	1.70	1.70	1.70	2.70	3.90
Grate Bars, Peacoal A	1.65	1.65	1.65	2.60	4.60
Grate Bars, Coarse B	1 70	1.70	1.70	2.60	5.20
Grate Bars, Peacoal B	1.65	1.65	1.65	2.60	6.75
Connecting Rod Support	.30	.30	.30	.30	.40
Shaker Slide	.30	.30	.30	.30	.30
Shaker Bracket	.30	.30	.30	.30	.30
Shaker Arm	.40	.40	.40	.70	.70
Shaker Handle	.70	.70	.70	.70	.70
Shaker Link	.30	.30	.30	.30	.30
Fire Door	2.00	2.00	2.00	2.20	.
Fire Door, R. or L.	.	. .	.	. .	3.00
Fire Door Frame	3.00	3.00	3.00	4.00	
Fire Door Lining	.90	.90	.90	1.15	. .
Fire Door Lining, R. or L.	. .	.	.	.	2.25
Fire Door Handle	.35	.35	.35	.35	.40
Fire Door Slide	.30	.30	.30	.30	.30
Fire Door Pin	N. C.	N. C.	N. C.	N. C.	N. C.
Clinker Door, O. S.	.65	.65	.65	.	.70
Clinker Door, Pres. S.	. .	.	.	.70	.
Clinker Door, Pres. S., R. or L.	. .	. .	.	. .	.70
Clinker Door Lining	.50	.50	.50	.30	.30
Clinker Door Handle	.30	.30	.30	.30	.40
Cleanout Door, R. or L.	.60	.60	.60	1.20	2.50
Cleanout Door Lining, R. or L.	.60	.60	.60	.90	1.50
Small Door Handles	.30	.30	.30	.30	.30
Latch Plate	.30	.30	.30	.30	.30
Hinge Plate	.30	.30	.30	.30	50

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

CAPITOL IMPROVED SQUARE SECTIONAL

A or B Styles—Continued

Name of Parts	Series Number				
	25-A		25-B	37″	48″
	Steam	Water			
Hinge Plate, C. O. Door, R. or L.					$0.70
Center Strip				$0.30	.75
Center Strip, Water or Steam	$0.30	$0.30	$0.30		
Smokehood only				10.00	12.25
Smokehood Damper	.75	.75	.75	2.00	1.25
Smokehood Damper Rod	.30	.30	.30	.30	.30
Smokehood Check Door	.45	.45	.45	.70	1.25
Smokehood Ratchet, R. or L.	.30	.30	.30	.30	.30
Smokehood Indicator Plate	.30	.30	.30	.30	.30
Smokehood Indicator Catch	N. C.	N. C.	N. C.	.30	.30
Smokehood Indicator Handle	.30	.30	.30	.30	.30
Smokehood Complete	6.25	6.25	6.25	13.70	16.50
Bridgwall Plates, A Style				8.65	
Bridgwall Plates, B Style				8.85	
Bridgwall Plates, R. or L., A or B Style				2.25	8.25
Water Column	1.50	1.50	1.50	1.50	3.50
Water Column Pipe Connections	1.50	1.50	1.50	1.75	2.00
Diaphragm	2.25	2.25	2.25	2.25	2.25
Diaphragm Lever or Plunger	.30	.30	.30	.30	.30
Diaphragm Weight	.50	.50	.50	.50	.50
Diaphragm Rubber	1.00	1.00	1.00	1.00	1.00
Diaphragm Complete	5.00	5.00	5.00	5.00	5.00
Steam Trimmings Complete	8.75	8.75	8.75	8.75	12.00
Number Plate	N. C.	N. C.	N. C.	N. C.	N. C.
Upper Nipple	.30	.30	.30	.50	.60
Lower Nipple	.30	.30	.30	.30	.40
Lower Nipple, A Style				.40	
Rear Base Nipple	.40	.40	.40	.50	.50
Upper Connecting Bolt	.30	.30	.30	.30	.40
Lower Connecting Bolt	.30	.30	.30	.30	.30
Rear Base Connecting Bolt	.30	.30	.30	.40	.40
Hoe	.50	.50	.50	.75	1.00
Poker	.75	.75	.75	1.00	1.20
Flue Brush	.75	.75	.75	1.00	1.25

One less grate bar than number of sections contained in above series of boilers having standard size grate. Grates reduced by bridge wall plates on 37 and 48 Series have special number of bars.

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

CAPITOL SOLAR
Old Style and Improved

Boiler No.	Flue Door	Flue Door Lining	Flue Door Frame	Boiler No.	Flue Door	Flue Door Lining	Flue Door Frame
702	$0.40	$0.30	$0.50	1804	$1.50	$1.25	$1.90
1002	.40	.30	.50	1805	2.25	1.50	2.00
1003	.75	.50	1.15	2403	1.20	.70	1.25
1004	.90	.50	1.25	2404	1.50	1.25	2.25
1402	1.00	.30	.75	2405	2.25	1.50	2.00
1403	1.20	.70	1.25	3303	1.20	.70	1.25
1404	1.50	1.25	1.75	3304	1.50	1.25	2.25
1803	1.20	.70	1.25	3305	2.25	1.50	2.00

Name of Parts	Series Number 70 100 16	140 20	180 23	240 26	330 29
Base Pres. Style 100 Series	$ 6.75				
Base Old Style (16 and 70, Inclusive)	5.80	$10.50	$12.50	$14.50	$19.25
Ash Pit, Front	1.20	1.75	1.95	2.40	2.65
Ash Pit Door (A. P. D.-26-B) (26)	1.00	1.75	1.50	2.25	2.00
Ash Pit, Drop Door (L. D.-26-B) 29", 26", 29"	.50	.50	.70	.70	.70
Ash Pit Butterfly Door	.60	.60	1.00	1.00	1.00
Grate Ring	1.20	1.80	2.40	3.40	3.60
Grate Bar 1st	.50	1.00	1.10	1.10	1.20
Grate Bar 2nd	.60	1.10	1.20	1.50	1.70
Grate Bar 3rd	.50	1.00	1.10	1.50	1.90
Grate Bar 4th	.	.	.	1.10	1.70
Grate Bar 5th	.	.	.	.	1.20
Shaker Arm (20-23)-(26-29)	.45	.45	.45	.45	.45
Shaker Bracket, R., 20-8, R, 26-8, 16-20, 23-25-29	.30	.30	.30	.30	.30
Shaker Catch, 20-23-26-29	N. C.	N. C.	N. C.	N. C.	N. C.
Shaker Plates	.30	.30	.30	.30	.30
Shaker Handle	.70	.70	.70	.70	.70
Shaker Offset Rod	.50	.50	.60	.70	.80
Connecting Rod	.40	.40	.50	.50	.60
Wedges for Grate Rings 3/16-3/20-4/23-26-29	.30	.30	.30	.30	.30
Fire Pot	33.50	47.60	56.00	67.00	83.00
Fire Pot, 16 Series	29.00	.	.	.	.
Fire Door, 20-23-26	.90	1.40	1.40	1.40	2.00
Fire Pot Frame	1.60	2.25	2.00	2.25	2.60
Fire Pot Lining, 20-23-26	.50	.70	.70	.70	1.10
Fire Door Vent	.30	.30	.30	.30	.30
Fire Door Handles	.50	.50	.50	.50	.50
Clinker Door, 20-23-26-29	.50	.50	.50	.50	.50

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

CAPITOL SOLAR
Continued

Name of Parts	Series Number 70 100 16	140 20	180 23	240 26	330 29
Clinker Door Frame	$0.90	$0.90	$0.90	$0.90	$0.90
Clinker Door Lining, 20-23-26-29	.30	.30	.30	.30	.30
Small Door Handles	.35	.35	.35	.35	.35
Center Hole Section		14.20	15.60	18.60	27.80
Outer Hole Section		14.50	16.80	21.20	24.10
Outer and Center Hole Section		13.50	18.80	19.90	23.80
Intermediate 16 & 100 Series 3 Nipple	11.00				
Intermediate 100 Series 2 Nipple	7.00				
Topheader (Steam)	15.20	22.80	27.50	41.00	48.70
Topheader (Water)	11.00	13.90	16.20	19.80	23.50
Smokehood Only	1.25	1.60	3.00	4.00	5.00
Smokehood Check Door	.30	.30	.30	.30	.30
Smokehood Neck	.60	.60	.75	1.00	1.50
Smokehood Door Frame	.30	.30	.30	.30	.30
Smokehood Damper	.30	.60	.60	.75	1.00
Smokehood Ratchet	.30	.30	.30	.30	.30
Smokehood Damper Rod	.30	.30	.40	.50	.50
Smokehood Damper Catch	.30	.30	.30	.30	.30
Smokehood Damper Handle	.30	.30	.30	.30	.30
Smokehood Complete	2.50	3.25	5.00	6.25	7.50
Diaphragm	3.00	3.00	3.00	3.00	3.00
Diaphragm Lever	.30	.30	.30	.30	.30
Diaphragm Plunger	.30	.30	.30	.30	.30
Diaphragm Rubber	1.00	1.00	1.00	1.00	1.00
Diaphragm Weight	.50	.50	.50	.50	.50
Diaphragm Complete	5.10	5.10	5.10	5.10	5.10
Steam Trimmings Complete	8.75	8.75	8.75	8.75	8.75
Water Column	1.00	1.00	1.00	1.00	1.00
Section Connecting Bolt	.40	.40	.40	.50	.50
Nipples	.30	.30	.30	.30	.30
Hoe	50	.50	.50	.50	.50
Poker	.50	.50	.50	.50	.50
Flue Brush	.75	.75	.75	.75	.75
Flue Brush Handle	.40	.40	.40	.40	.40
No. Grate Bars Each Series	Three	Three	Three	Four	Five

Capitol Solar Boilers were shipped from Detroit with both two and three nipple connections and at different times with three nipple sizes.

All shipments from Geneva Plant with two nipple connections.

When ordering repairs it is necessary that Serial Number and Size Number be given as well as an accurate description of parts wanted.

See Notes, page 158, when ordering

CAPITOL 250 SERIES

	PATTERN NAME	Weight, Each	Price
1	R. H. Cleanout Door	7	$0.90
2	L. H. Cleanout Door	6½	.90
3	Cleanout Door Handle	1	.30
4	Cleanout Door Handle Latch or Key	½	.30
5	Cleanout Door Hinge Lug Plate	1	.30
6	Fire Door	16	2.00
7	Fire Door Lining	7	.90
8	Fire Door Vent	1	.30
9	Fire Door Hinge Plate	1½	.30
10	Fire Door Catch Plate	½	.30
11	Fire Door Handle	½	.30
12	R. H. Smoke Box (with check opening)	15	1.90
13	L. H. Smoke Box (plain)	15	1.90
14	Smoke Hood Damper	3½	.50
15	Check Door for Smokehood	2	.30
16	Check Door Ratchet	¼	.30
17	Smoke Hood Damper Arm	½	.30
18	Rear Damper Lever Arm or Standard	1½	.30
19	Smoke Hood Damper Angle Lever	1¼	.30
20	Front Lever Arm or Standard	2	.30
21	Front Smoke Hood Lever Handle	1¼	.30
22	Coil Hole Cover	½	.30
23	Base Front	41	4.00
24	Ash Pit Door or Base Door	11½	1.40
25	Ash Pit Door Slide	1½	.30
26	Clinker Door	6	.75
27	Clinker Door Lining	4	.50
28	Shaker Catch	1	.30
29	Shaker Arm	5½	.35
30	Shaker Link	1½	.30
31	R. H. Base Side (front)	46	3.50
32	Draft Door Frame	2½	.30
33	Draft Door	2¼	.30
34	Draft Door Ratchet	¼	.30
35	L. H. Base Side (Front)	49	3.75
36	Connecting Bar Bracket	2	.30
37	R. H. Base Side (2 grate extension)	24	1.80
38	R. H. Base Side (1 grate extension)	11½	.85
39	L. H. Base Side (2 grate exteosion)	22	1.65
40	L. H. Base Side (1 grate extension)	11½	.85
41	Back Base Plate (bottom)	16	1.20
42	Back Base Plate (top)	17½	1.30
43	Front Half Grate Bar (pea coal or coarse)	9	.60
44	Full Grate Bar (coarse)	34	2.05
45	Full Grate Bar (pea coal)	39	2.35
46	Grate Bar Lug or Grate Lever	3	.30
47	R. H. Front Connecting Bar	7½	.45
48	L. H. Front Connecting Bar	9	.55
49	Connecting Bar Extension R. H. (4 grate)	10	.60
50	Connecting Bar Extension R. H. (3 grate)	8	.50
51	Connecting Bar Extension R. H. (2 grate)	6	.40
52	Connecting Bar Extension R. H. (1 grate)	4	.30
53	Shaker Handle	7½	.45
54	1⅞" x 4" Push Nipple	2	.40
55	1⅞" x 3" Push Nipple	1½	.40
56	Front	410	41.00
57	Back	454	45.40
58	Regular Intermediate	387	38.70
59	Tapped Intermediate	400	40.00

When ordering repairs it is necessary that Serial Number and Size Number be given, as well as an accurate description of parts wanted.

See Notes, page 158, when ordering.

RADIATOR TAPPING LIST

STEAM

ONE-PIPE WORK

Radiators containing 24 square feet and under	1 inch
Above 24, but not exceeding 60 square feet	1¼ inch
Above 60, but not exceeding 100 square feet	1½ inch
Above 100 square feet	2 inch

TWO-PIPE WORK

Radiators containing 48 square feet and under	1 x ¾ inch
Above 48, but not exceeding 96 square feet	1¼ x 1 inch
Above 96 square feet	1½ x 1¼ inch

WATER

TAPPED FOR SUPPLY AND RETURN

Radiators containing 40 square feet and under	1 inch
Above 40, but not exceeding 72 square feet	1¼ inch
Above 72 square feet	1½ inch

All Direct Radiators are regularly made with air valve tappings ⅛ inch. When radiators are ordered for vapor or vacuum heating, specific instructions should be given as to method of tapping.

Water radiators are regularly shipped with blank at top of leg sections, but can be tapped 1½ inches or smaller on special order.

Unless otherwise ordered, all openings of Direct Radiators will have right-hand threads (except that of Wall Radiators where tapped 1½ inches, in which case tapping at one end is right-hand and left hand on opposite end).

All Radiators listed herein (except Triton Flue and Triton Wall Radiators) are constructed with extra heavy malleable cast iron push nipples.

RADIATOR PRICE LIST AND RATING PER SECTION IN SQUARE FEET

Height in inches	45	44	38	32	26	23	22	20	18	20	17	15	14
Price per square foot, cents	42	42	42	46	50	53	53	57	58	57	59	62	64
One-column, Steam and Water													
Triton Plain	..	..	3	2½	2	..	1⅔	1½	..	..	..	..	..
Triton Ornamental	..	..	3	2½	2	1⅔	..	1½	..	..	..	..	..
Florentine	..	..	3	2½	2	..	1⅔	..	1⅓	..	..	..	..
Grecian	..	..	3	2½	2	1⅔	..	1½	..	..	..	..	..
Two-column, Steam and Water													
Triton Plain	5	..	4	3⅓	2⅔	..	2¼	2	..	..	..	1½	..
Triton Ornamental	..	5	4	3⅓	2⅔	2⅓	..	2	..	..	..	..	..
Florentine	5	..	4	3⅓	2⅔	..	2¼	..	1¾	..	..	..	..
Grecian	5	..	4	3⅓	2⅔	2⅓	..	2	..	..	..	..	..
Triton Plain, Hospital	5	..	4	3⅓	2⅔	..	2¼	2	..	..	..	..	..
Three-column, Steam and Water													
Triton Plain	6	..	5	4½	3¾	..	3	2¼	..	..	..	..	..
Triton Ornamental	..	6	5	4½	3¾	3¼	..	2¾	2¼	..	..	..	..
Florentine	..	6	5	4½	3¾	..	3	..	2¼	..	..	..	..
Grecian	6	..	5	4½	3¾	3¼	..	2¾	..	..	..	..	..
Four-column, Steam or Water													
Triton Plain	..	10	8½	7	5½	..	4½	..	3½	..	..	..	..
Triton Ornamental	..	10	8½	7	5½	4½	..	4	3½	..	..	..	..
Florentine	..	10	8½	7	5½	..	4½	..	3½	..	..	..	..
Grecian	10	..	8	6½	5	4¼	..	3½	..	..	..	..	..
Five-column, Steam or Water													
Triton Plain, Window	..	..	..	..	..	..	..	..	..	5½	4¾	..	4
Triton Flue, Steam or Water	..	..	7	5¾	4½	..	..	3¼	..	..	..	..	..

TRITON WALL RADIATORS FOR STEAM OR WATER

Extra large section, 9 square feet, per square foot	$0.42
Standard section, 7 square feet, per square foot	.42
Small section, 5 square feet, per square foot	.46

PIN INDIRECT RADIATORS FOR STEAM OR WATER

10 foot section, price per section	$2.70
15 foot section, price per section	4.05
20 foot section, price per section	5.40

RADIATOR REPAIRS

IN ordering repairs for radiators, much time and annoyance will be saved if the order clearly states fully all details of part wanted. Many times an incomplete description or lack of sketch showing details of part wanted makes it necessary for several letters to pass back and forth before the proper shipment can be made.

When the part is for a radiator of special construction, a sketch should also accompany written description on order.

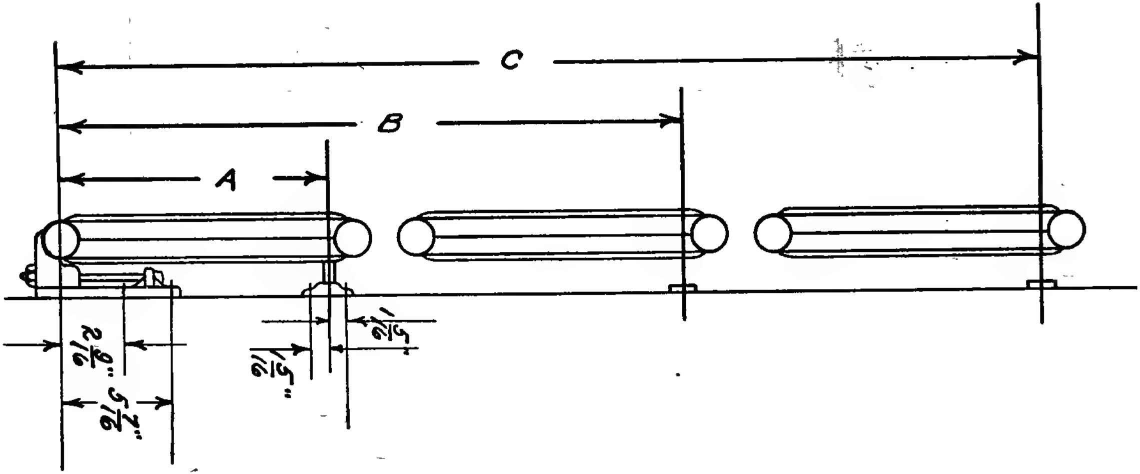
When ordering radiator sections mention the following: Name of radiator, pattern of radiator, height of radiator, whether end leg section, center leg section, or regular intermediate section, and if supply or return end leg section or blank end leg section (for one-pipe steam) is wanted, also state if for steam or water, one or two-pipe work, slip nipple or screw nipple connection and high or low drip hubs. If water radiators are being used for steam this fact should also be mentioned.

Orders for indirect radiator repairs should clearly state whether end or intermediate section is wanted and whether blank or tapped when an end section. A sketch of section showing position of desired tappings, should be sent with order. Also state whether slip nipple or screw nipple connection is wanted.

SPECIAL NOTE

Repairs for radiators not illustrated in this catalogue will be charged at higher prices than standard goods.

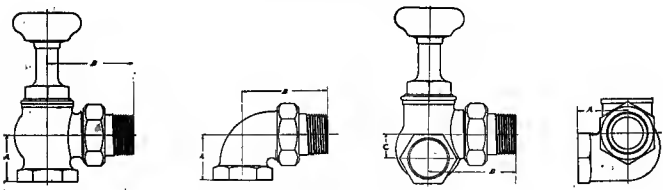
ADJUSTABLE WALL BRACKETS



DIMENSIONS FOR USE WITH TRITON ADJUSTABLE WALL BRACKET

Kind of Section	A	B	C
All Horizontal	$9\frac{1}{2}$"	$23\frac{3}{8}$"	3'–$1\frac{1}{4}$"
9' Vertical	2'–$0\frac{3}{8}$"	4'–$5\frac{5}{8}$"	6'–$10\frac{7}{8}$"
7' Vertical	18"	3'–$4\frac{7}{8}$"	5'–$3\frac{3}{4}$"
5' Vertical	$11\frac{5}{8}$"	2'–$4\frac{1}{8}$"	3'–$8\frac{5}{8}$"

ROUGHING-IN MEASUREMENTS OF VALVES AND ELBOWS



Size Inches		½	¾	1	1¼	1½	2
512, 112, 312, 412	A	1¼	1 3/8	1 5/8	1 7/8	2 3/32	2½
512, 112, 312, 412	B	2 13/32	2 3/4	3 3/32	3 7/16	3 7/8	4 21/32
522, 523	A	1¼	1 3/8	1 5/8	1 7/8	2 3/32	...
522, 523	B	2 13/32	2 3/4	3 3/32	3 7/16	3 7/8	...
52, 202	A	1¼	1 3/8	1 5/8	1 7/8	2 7/32	2½
52, 202	B	2 13/32	2 3/4	3 5/32	3 7/16	3 31/32	4¾
42	A	1¼	1¼	1½	1 21/32	2	2 9/32
42	B	2 13/32	2 5/8	3 3/16	3 3/8	3¾	4 17/32
612, 212	A	1¼	1½	1¾	1 31/32	2 11/32	2 5/8
612, 212	B	2 13/32	2 7/8	3¼	3½	4	4 25/32
612, 212	C	9/16	¾	13/16	15/16	1 5/16	1 17/32
622, 623	A	1¼	1½	1¾	1 31/32	2 11/32	...
622, 623	B	2 13/32	2 7/8	3¼	3½	4	...
622, 623	C	9/16	¾	13/16	15/16	1 5/16	...

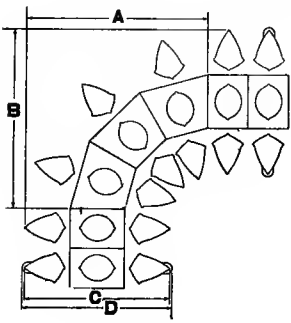
SPECIAL DATA ON UNITED STATES RADIATORS

MEASUREMENTS OF SECTIONS AND TAPPINGS

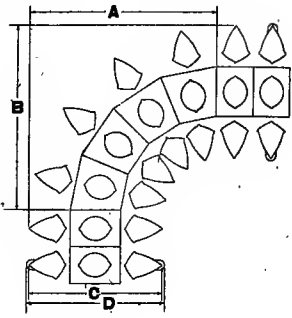
Style	Dimensions of Sections			Distance from Floor to Center of Tappings		Distance from Floor to Center of Upper Tappings										
	Width Inches	Width Legs Inches	Thickness Inches	Water and Steam Supply and Return, In. Push Nipple		45 In.	44 In.	38 In.	32 In.	26 In.	23 In.	22 In.	20 In.	18 In.	17 In.	15 In.	14 In.
				Water	Steam												
Triton Plain — One-column	4 1/2	5 11/16	2 1/2	4 1/2	4	. .		35 1/16	29 1/16	23 5/8		19 5/8	17 13/16		.		
Triton Plain — Two-column	7 1/8	7 11/16	2 1/2	4 1/2	4	42 5/8		35 1/16	29 1/16	23 5/8		19 5/8	17 13/16	. .		12 1/16	
Triton Plain — Three-column	9	9 1/16	2 1/2	4 1/2	4	42 5/8		35 1/16	29 1/16	23 5/8		19 5/8	.	15 3/4	.	.	
Triton Plain — Four-column	12 1/2	12 11/16	3	4 1/2	4 1/2	.	41 1/16	35 1/16	29 1/16	23 5/8		19 5/8	.	15 3/4	.		
Triton Window	13	13	3	3 1/2	3 1/2	.		.					18 1/16	.	15 1/16	.	12 1/16
Triton Ornamental — One-column	4 1/2	5 1/4	2 1/2	4 1/4	4 1/4		. .	35 1/2	29 3/8	23 5/8	20 5/8		17 5/8	. .	.		
Triton Ornamental — Two-column	7 1/4	8 1/4	2 1/2	4 1/4	4 1/4		41 1/2	35 7/16	29 5/8	23 5/8	20 5/8	.	17 5/8	. .	.		
Triton Ornamental — Three-column	9 1/8	10 1/8	2 1/2	4 1/4	4 1/4		40 7/8	35 1/16	29 1/16	23 7/8	20 11/16	.	17 5/8	15 1/8	. .		. .
Triton Ornamental — Four-column	12 3/4	13 3/4	3	4 1/8	4 1/8		40 7/8	35 1/8	29 1/16	23 5/8	20 1/4		16 11/16	15 1/4	.		. .
Triton Flue	9 1/8	9 1/8	3	5 1/2	5 1/2	.	.	30 3/4	24 11/16	18 5/8	.	.	12 11/16	. .			
Florentine — One-column	4 1/2	5 1/2	2 1/2	4	4	. .		35 1/2	29 1/2	23 1/2	.	19 3/4	. .	15 3/4	. .		. .
Florentine — Two-column	7 1/8	8 1/8	2 1/2	4	4	42 1/4	.	35 1/2	29 1/2	23 1/2	.	19 3/4	. .	15 3/4	. .		. .
Florentine — Three-column	9 1/8	9 1/8	2 1/2	4	4	.	41 1/2	35 1/2	29 1/2	23 1/2	.	19 3/4	. .	15 3/4	. .		. .
Florentine — Four-column	12 1/2	13 1/2	2 3/4	4 1/2	4 1/2		41 1/2	35 1/2	29 1/2	23 1/2	. .	19 3/4	.	15 3/4	. .	. .	. .
Grecian — One-column	4 1/2	5	2 1/2	4 1/2	4 1/2	. .	.	35 1/4	29 1/4	23 1/4	20 1/4	.	17 1/4	. .	.	.	
Grecian — Two-column	7 3/4	8 1/4	2 1/2	4 1/2	4 1/2	42 1/4	.	35 1/4	29 1/4	23 1/4	20 1/4	. .	17 1/4	. .	.	.	
Grecian — Three-column	9	9 3/4	2 1/2	4 1/2	4 1/2	42 1/4		35 1/4	29 1/4	23 1/4	20 1/4	. .	17 1/4	. .	.	.	
Grecian — Four-column	11	11 3/4	3	4 1/2	4 1/2	42 1/4		35 1/4	29 1/4	23 1/4	20 1/4	. .	17 1/4	. .	.	.	

Radiators of 19 section to 35 section, 1 center leg
Radiators of 35 section to 52 section, 2 center legs

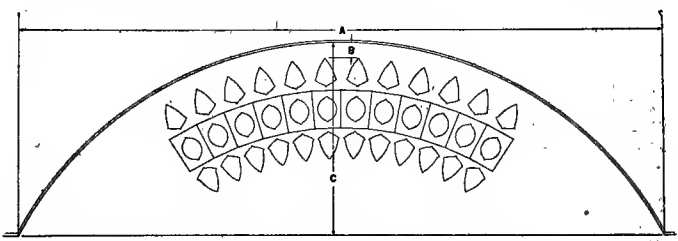
MEASUREMENTS FOR TRITON PLAIN RADIATORS



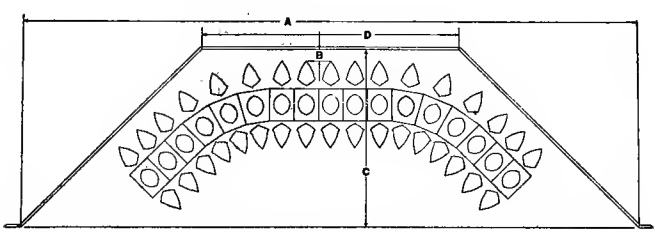
	A and B	C	D
1 Col.	9	4½	5 1/32
2 Col.	10¼	7⅛	7 3/32
3 Col.	11¼	9	9 1/16



	A and B	C	D
	10⅝	4½	5 1/32
	11⅝	7⅛	7 3/32
	12⅝	9	9 1/16



When ordering curved radiators, give measurements A, B and C.



When ordering bay window radiators, give measurements A, B, C and D.

WALL RADIATORS

In ordering state the size and number of sections to each radiator, give the assembly figure number and state the number of "Tiers" high or "Stacks" wide, as the case may be. State also the size and location of tappings desired, using the tapping numbers shown on figure for this purpose.

Sections are assembled for shipment only in single tiers or single stacks. Where figures show double tiers or double stacks it is to be understood that the figures will be shipped disconnected at the hexagon nipples. Note that when sections, regardless of type, are assembled side to side, the maximum number of sections which will be shipped assembled is, for each size:—

5 ft.—5 sections
7 ft.—5 sections
9 ft.—5 sections
See Figures 9—9A—11—13—15—2—4—6

And when assembled end to end the maximum number of sections which will be shipped assembled is, for each size:—

5 ft.—5 sections
7 ft.—4 sections
9 ft.—3 sections
See Figures 1—3—5—7—15—8—8A—10—12

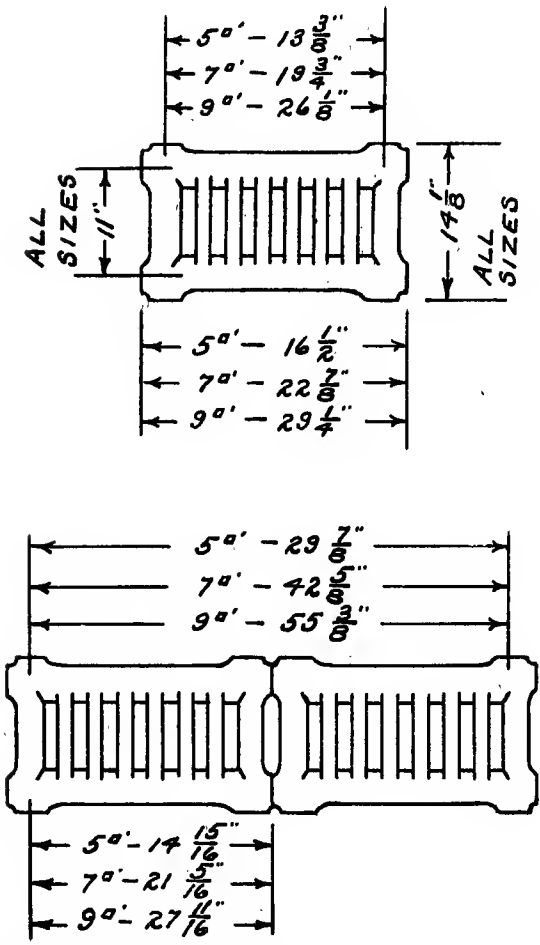
The regular tappings as shown on the various assembly figures are indicated by 2, 3, 4, 5, 6, 7, 8 and 9. 12, 13, 14, 15, 16, 17, 18, 19, indicate special tappings which can be furnished at points so marked if required and for which an extra charge of 10 cents each, net, will be made.

Numbers 2, 9, 3, 4, and 12, 19, 13, 14 are left hand tappings.

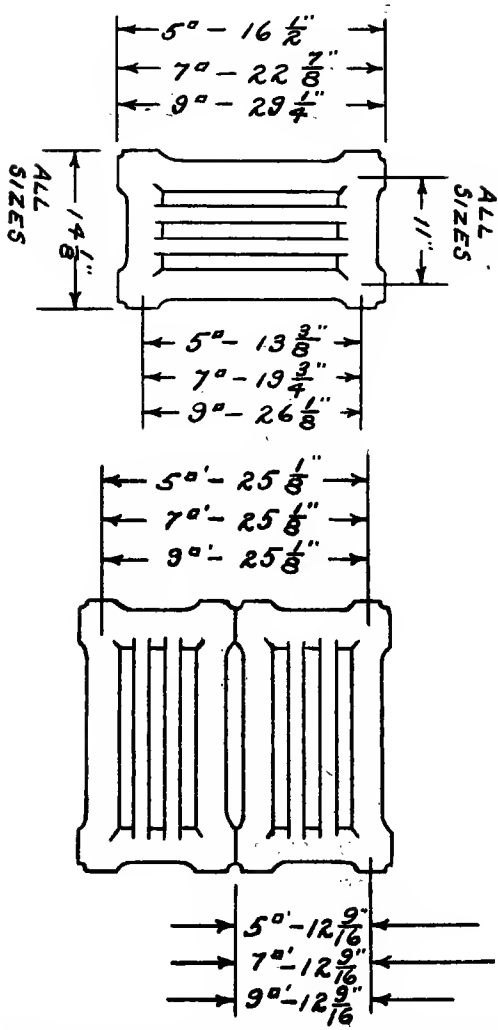
Numbers 5, 6, 7, 8 and 15, 16, 17, 18 are right hand tappings.

Tappings are 1½" supply and return and are bushed as per list on page 176.

See note on page 192.



Above measurements apply to A or B styles. See note on tappings page 183.



Above measurements apply to A or B styles. See note on tappings page 183.

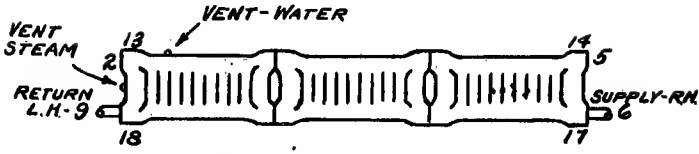


Fig. 1. Assembled in single tier. Water or one and two pipe steam.

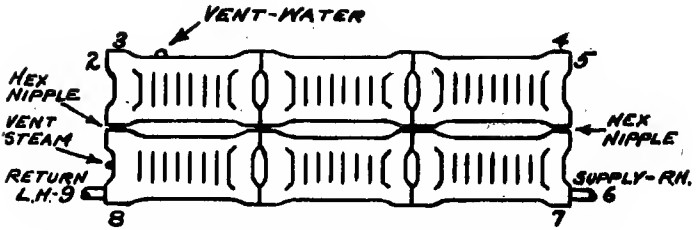


Fig. 3. Assembled in two or more tiers. Water or steam.

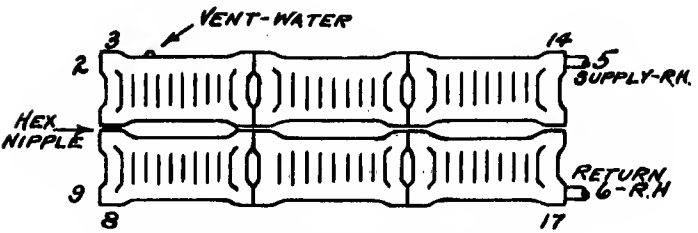


Fig. 5. Assembled in two tiers. Water only.

See note on tappings page 183

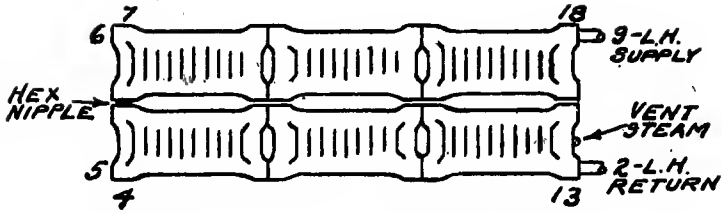


Fig 7. Assembled in two tiers. Two pipe steam only

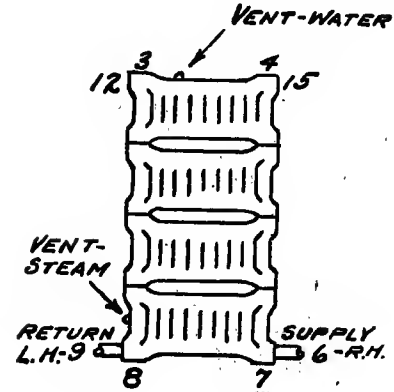
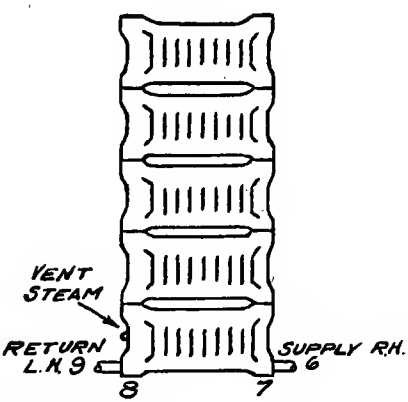


Fig. 9. Assembled in single stack. Water or one and two pipe steam.

Fig. 9A. Assembled in single stack. One and two pipe steam only.



See note on tappings page 183

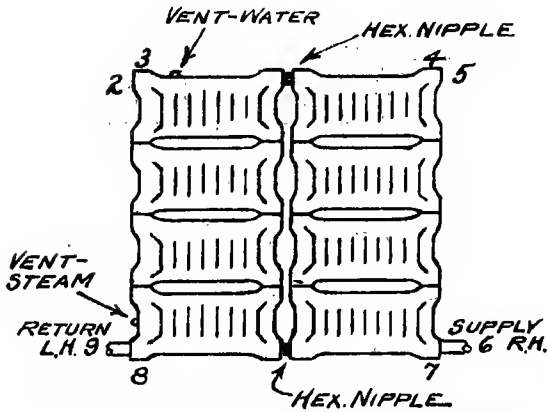


Fig. 11. Assembled in two or more stacks. Water or steam.

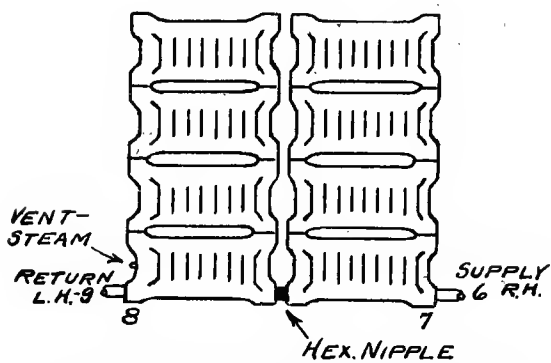


Fig. 13. Assembled in two or more stacks. One and two pipe steam only. Bottom feed only.

See note on tappings page 183

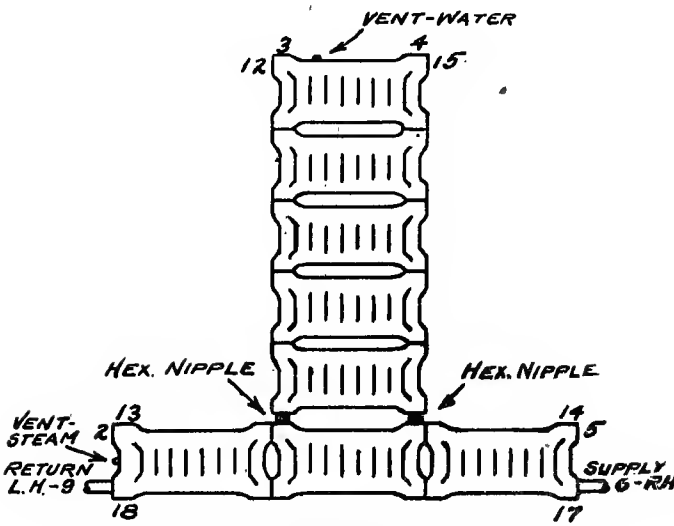


Fig. 15. Assembled in single tier and single stack. Water or one and two pipe steam.

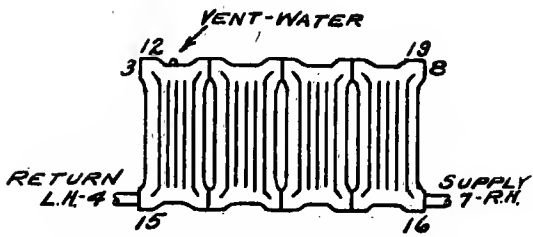


Fig. 2. Assembled in single tier. Water only.

See note on tappings page 183

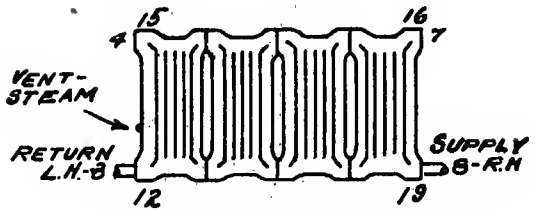


Fig. 4. Assembled in single tier. One and two pipe steam only.

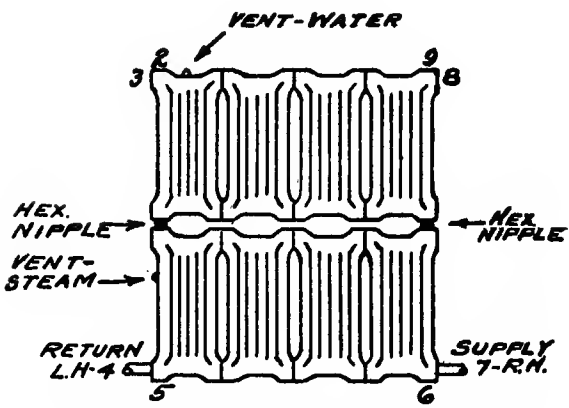


Fig. 6. Assembled in two or more tiers. Water or steam.

See note on tappings page 183

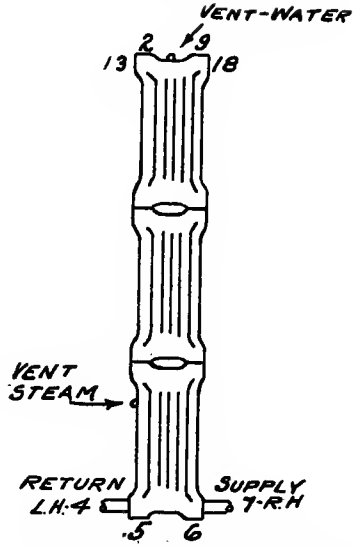


Fig. 8. Assembled in single stack. Water or one and two-pipe steam.

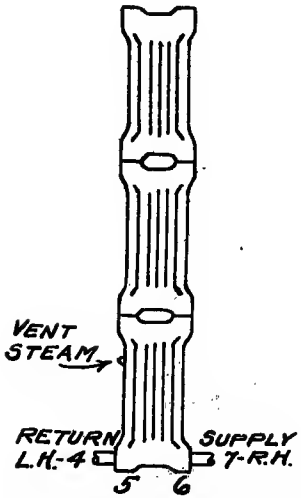


Fig. 8A. Assembled in single stack. One and two-pipe steam only. Bottom feed only.

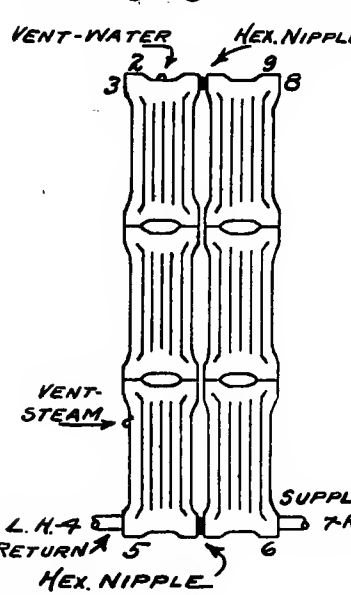


Fig. 10. Assembled in two or more stacks. Water or steam

See note on tappings page 183

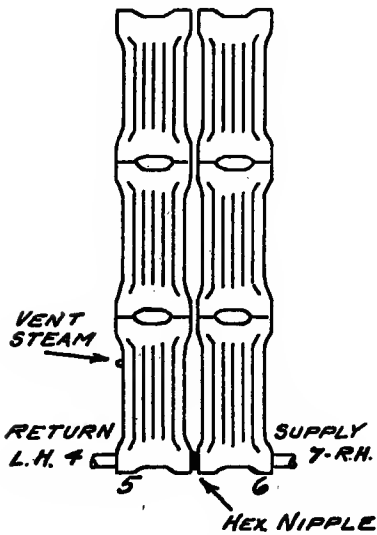
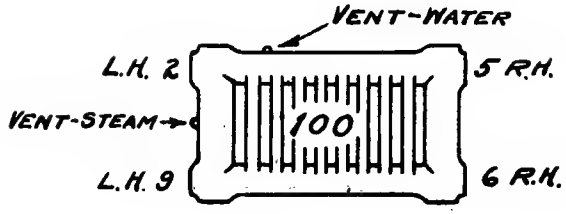
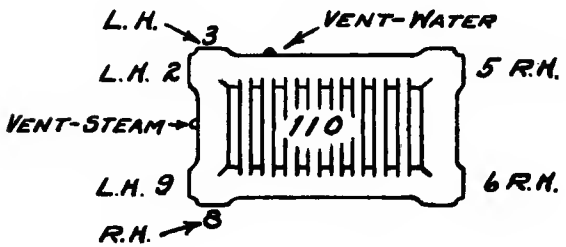


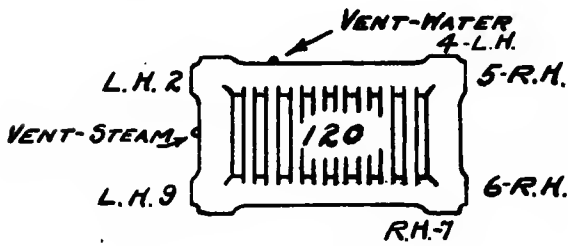
Fig. 12. Assembled in two or more stacks. One and two pipe steam only. Bottom feed only.

See note on tappings page 183

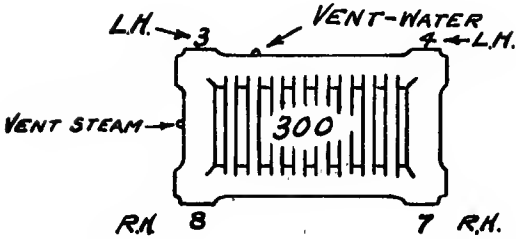
NOTE—When ordering wall radiator sections to replace sections in stacks or tiers, section number should be given, as shown on pages 193 to 196, also state whether radiator is used for steam or water.

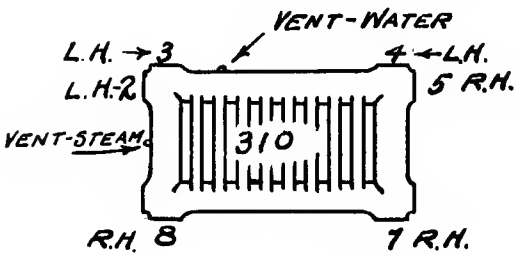


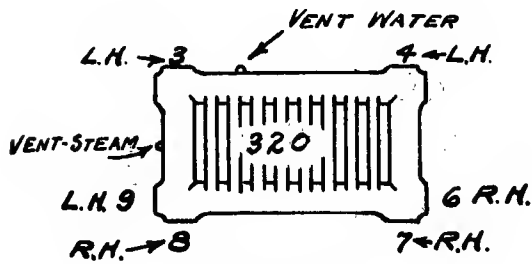




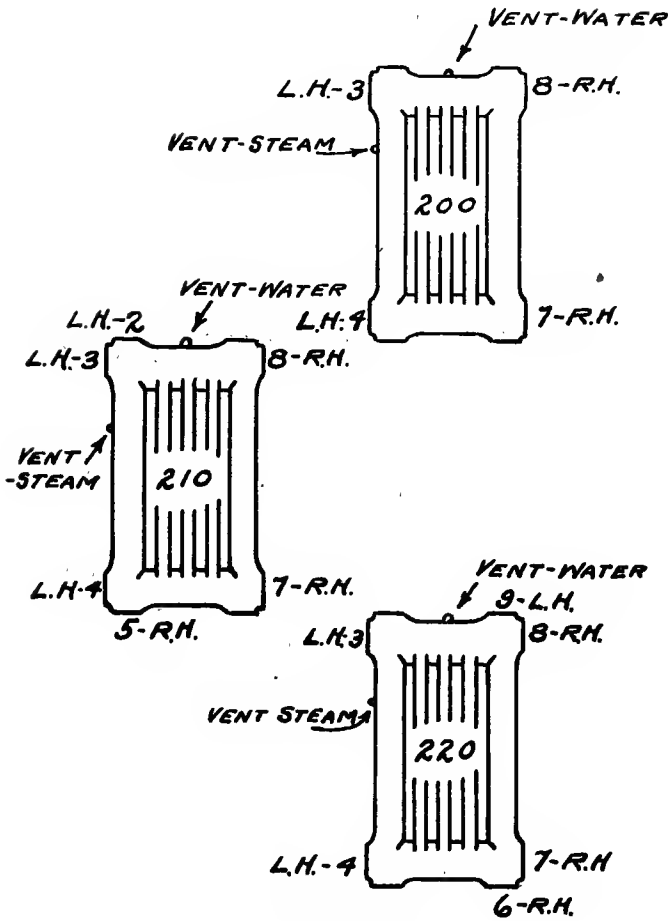
See note page 192



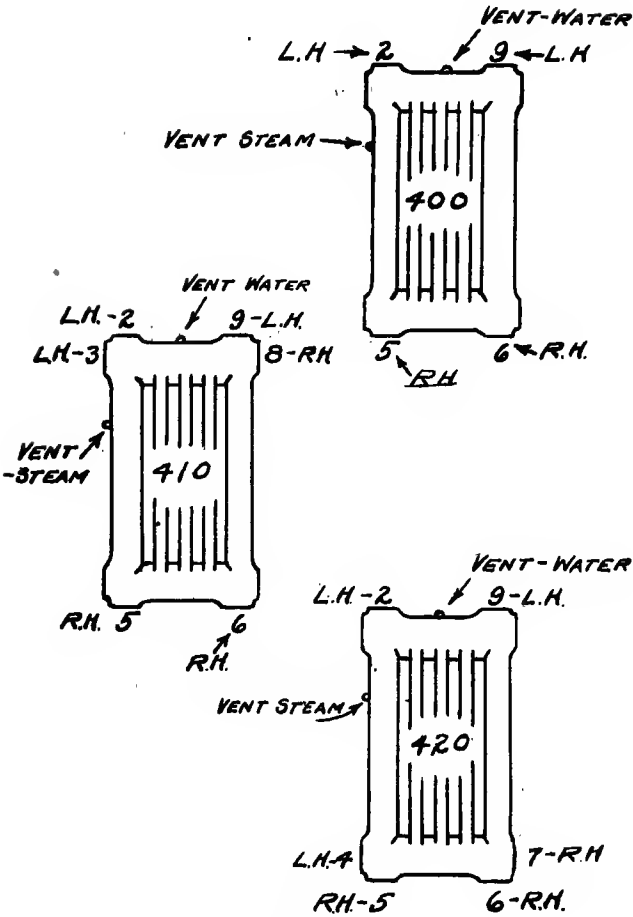




See note page 192



See note page 192



See note page 192

DATA ON WALL RADIATION

Comparative tests of Triton Wall Radiators

To correctly determine the co-efficient of wall radiators and pipe coils the engineering department of the University of Michigan under direction of Prof. John R. Allen conducted a series of tests using Triton Wall, Rococo Wall, and Pipe Coils of equal footage. The following summary shows result reduced to uniform difference of temperature of 144 degrees.

	7 ft. Vertical	7 ft. Horizontal	9 ft. Vertical	9 ft. Horizontal
Triton	1.915	1.94	1.915	1.94
Rococo	1.825	1.895	1.925	1.90

Under similar conditions "K" for pipe coils equals 2.425.

DETAILS OF TEST

		9-foot Vertical		9-foot Horizontal		7-foot Vertical		7-foot Horizontal		•
1	Radiator	Triton	Rococo	Triton	Rococo	Triton	Rococo	Triton	Rococo	Wall Coil
3	Height—max	28 1/16	29 1/16	13 7/8	13 5/16	22 1/2	21 7/8	13 7/8	13 5/16	.....
4	No. sec.	4	4	4	4	5	5	5	5	.....
5	Rated sur. sq. ft.	36	36	36	36	35	35	35	35	35.69
6	Total length, in.	56 1/2	53 1/4	117	116 1/4	70 5/8	67 1/16	114 3/8	109 5/8	.....
14	Pr. Stm. in rad. pds. gage	1.07	1.07	1.20	.80	.97	.73	.78	.96	1.04
15	• Pr. stm. in rad. pds. abs	15.45	15.27	15.31	15.18	15.25	15.03	15.28	15.37	15.32
16	Temp. stm. ent. rad.	218.0	216.1	220.2	219.4	220.9	225.7	221.5	219.4	223.5
17	Temp. stm. ent. rad. corresponding to pr.	214.5	214.0	214.0	213.6	213.9	213.1	214.0	214.2	214.1
18	Degrees super heat	3.5	2.1	6.2	5.8	7.0	12.6	7.5	5.2	9.4
19	B. T. U. super heat	1.6	1.0	2.9	2.7	3.3	5.9	3.5	2.4	4.4
20	Latent heat	968.7	969.2	969.1	969.3	969.3	969.6	969.1	968.9	969.0
21	B. T. U. per pd. stm.	970.3	970.2	972.0	972.0	972.6	975.5	972.6	971.3	973.4
22	Room temp	81.9	81.9	83.4	78.3	81.2	85.7	77.5	83.7	85.6
23	Outside temp	53.3	57.1	49.7	42.5	60.5	57.3	45.2	52.3	64.3
25	Diff. between stm. and room temp	132.6	132.1	130.6	135.3	132.7	127.4	136.5	130.5	128.5
27	Cond. per hr. per sq. ft. (R. S.)	.251	.252	.252	.259	.251	.228	.267	.242	.305
29	B. T. U. per hr. per sq. ft. (R. S.)	244.0	244.2	245.4	251.6	244.3	222.5	260.1	235.6	296.8
30	B. T. U. per hr. per sq. ft. (R. S.) per degree diff	1.840	1.849	1.879	1.860	1.841	1.747	1.905	1.806	2.310

PROPORTIONING RADIATION

FOR STEAM AND WATER HEATING

BECAUSE of different conditions surrounding the installation of a heating apparatus, it is impossible to give any set rule that can be accepted, without modification, for all kinds of buildings to be heated. It is necessary to take into consideration all of the conditions in and around any building, and additions or deductions made to suit the requirements, no matter what rule may be used for figuring.

Nearly all rules are based on two to five pounds steam pressure and a temperature of 180 degrees for water, as indicated at the boiler when the outside temperature is at zero. When systems are designed for heating with a lower heat temperature at the boiler (vapor, vacuum, etc.), it is necessary to provide additional radiation in accordance with best practice for different systems.

It is general practice to consider 70 degrees as the standard for inside temperature and zero for the outside. When there is a greater difference between the inside and outside temperature, one per cent should be added to the radiation for each degree of difference.

Many contractors make the error of installing a too small amount of radiation. A little extra surface will give greater economy and insure a first-class working system, as well as a pleased owner. An apparatus of ample size can be regulated to give economy, which cannot be done if the apparatus is too small and requires forcing.

If direct-indirect radiation is to be used, 25 per cent should be added to the radiation necessary for direct heating. If indirect radiation is to be used, 50 per cent should be added to the amount of radiation necessary for direct heating. In schools, churches, etc., where ventilation is required, it is necessary to use some special rule for ventilating to obtain indirect surface. (Before determining the size of boiler required, all special forms of heating surface should be made the equivalent of direct radiation as shown on page 206.)

The following rules have been found to give good results, but are not guaranteed. By using these rules and providing for additional radiation on the cold sides of building and making allowance for poor construction, loose-fitting windows, doors, etc., good results will be obtained.

PROPORTIONING RADIATION—Continued
FOR STEAM AND WATER HEATING

Rule No. 1

THIS rule is based on outside temperature at zero and inside temperature at 70 degrees for walls 12 inches thick. Corrections should be made for varying conditions as stated below:

C equals cubic contents in cubic feet.
W equals exposed wall in square feet.
G equals glass (windows and doors) square feet.
R equals radiation in square feet.

Steam

$$\frac{(6\ C)+(80\ W)+(300\ G)}{1000}=R$$

Water

$$\frac{(6\ C)+(80\ W)+(300\ G)}{600}=R$$

EXAMPLE.—A given room has 50 square feet of glass, 220 square feet wall and 1800 cubic feet space. Substituting the figures in place of letters in formula above:

$$\frac{(6\times1800)+(80\times220)+(300\times50)}{1000}=$$

$$\frac{10800+17600+15000}{1000}=43.4 \text{ square feet steam radiation}$$

$$\frac{10800+17600+15000}{600}=72.3 \text{ square feet hot water radiation}$$

Corrections for Varying Temperatures and Local Conditions

Add one per cent of radiation for each degree below zero outside or above 70 degrees inside. Subtract one per cent for each degree above zero outside or below 70 degrees inside.

RESIDENCES

For Halls and Dining Rooms, use 10 C.
For Bath Rooms, use 20 C.
For Bed Rooms, use 5 C.

EXPOSURES

Rooms on sides of prevailing winds should have radiation increased 10 per cent. Walls exposed to unheated rooms and spaces use 40 W.

PROPORTIONING RADIATION—Continued

FOR STEAM AND WATER HEATING

HEAT LOSS THROUGH WALLS

Rule based on 12-inch Brick Wall or good Frame Construction.

8-inch Brick Wall, use 120 W.
12-inch Brick Wall, use 80 W.
16-inch Brick Wall, use 70 W.
20-inch Brick Wall, use 60 W.

Solid cement and concrete block when plastered directly on wall should be figured same as 8-inch brick. Same with space between wall and plaster as 12-inch brick. Brick veneer same as 12-inch brick.

GLASS

Double Windows, use 140 G.
Skylights same as Windows.

CHURCHES AND AUDITORIUMS

For steam multiply radiation found by rule by factors below for various sizes of buildings.

CONTENTS IN CUBIC FEET	FACTOR
30,000 to 50,000	.9
50,000 to 70,000	.85
70,000 to 90,000	.8
90,000 to 110,000	.75
over 110,000	.7

For water determine radiation by steam rule and above factors and multiply by 1.65.

For Garages and other buildings having a large number of air changes per hour, additional radiation should be provided.

Rule No. 2

Professor R. C. Carpenter, of Cornell University, submits the following rule for determing the size radiator needed for a given room:

RULE—Add the area of the glass surface in the room to one-quarter of the exposed wall surface, and to this add from 1/55 to 3/55 of the cubical contents (1/55 for rooms on upper floor, 2/55 for rooms on first floor and 3/55 for large halls); then for steam multiply by .25 and for hot water by .40.

EXAMPLE—A room 20x12x10 feet with glass exposure of 48 feet, one-quarter of wall exposure (two sides exposed) 320 feet = 80, 1/55 of 2400=44.

48+80+44=172×.25=43 feet for steam.
If you add 2/55 the surface would be 54 feet.
If you add 3/55 the surface would be 65 feet.

Corrections should be made as in Rule No. 1.

INDIRECT DATA

SETTING INDIRECT RADIATORS

Indirect Radiators are used for ventilating and for foot warmers, and for those places where radiators in the rooms would be objectionable.

In setting indirect stacks, care should be taken to see that both sides and ends come in contact with casings to prevent the passage of air other than directly through the radiator. A space of at least ten inches should be provided above the top and six to eight inches below the bottom of radiator for free circulation of air. The fresh air should be delivered to under side of radiator at opposite end from which the warm air is taken.

By using Capitol Casings for Indirect Radiators, as shown on page 000, much time and labor will be saved.

Better results are obtained by placing the register on the inside wall or near to an inside wall, when desired in floor. The warm air should be delivered to register from the top at one end of radiator.

Because the cold air comes in contact with Indirect Radiators, their cooling power is greatly increased over direct radiation and varies with the temperature, volume and velocity of air entering the stack.

Under ordinary conditions in house heating, indirect radiation will give off 400 to 650 B. T. U. for steam or 240 to 390 B. T. U. for water per square foot per hour. In ventilating school or other public buildings by gravity the above can be increased from one-half to two times. It is good engineering practice, when possible, to connect indirect stacks with a separate flow and return main from boiler.

The following table will be found of much value when designing or installing Indirect Radiators.

Sizes of Air Ducts and Registers for Indirect Heating

Square Feet of Radiation	Cold Air Duct to Stack		Warm Air Duct		Registers		Tappings Inches
	For First Floors Square Inches	For Upper Floors Square Inches	For First Floors Square Inches	For Upper Floors Square Inches	For First Floors Inches	For Upper Floors Inches	
40	40	35	60	40	10x12	8x10	1 x ¾
50	50	40	75	50	10x12	8x10	1 x ¾
60	60	45	90	60	10x14	8x12	1¼x1
70	70	50	105	70	12x15	10x12	1¼x1
80	80	60	120	80	12x15	10x12	1¼x1
90	90	70	135	90	12x19	10x14	1½x1¼
100	100	75	150	100	12x19	12x15	1½x1¼
120	110	90	170	110	16x16	12x15	1½x1¼
140	120	105	190	120	16x18	12x18	2 x1½
160	130	120	210	130	16x20	12x20	2 x1½

INDIRECT RADIATOR DATA

*FREE AREA BETWEEN SECTIONS OF PIN INDIRECT IN SQUARE FEET

Number Sections	10 SQUARE FEET				15 SQUARE FEET				20 SQUARE FEET			
	Push Nipple	Hex. Screw Nipple			Push Nipple	Hex. Screw Nipple			Push Nipple	Hex. Screw Nipple		
	Standard C. to C. 3⅛"	Standard C. to C. 4⅛"	C. to C. 4⅜"	C. to C. 4⅝"	Standard C. to C. 3¼"	Standard C. to C. 4¼"	C. to C. 4½"	C. to C. 4¾"	Standard C. to C. 3⅝"	Standard C. to C. 4⅝"	C. to C. 4⅞"	C. to C. 5⅛"
1	.299	.5282	.5855	.6428	.2804	.5078	.5646	.6215	.3772	.5998	.6549	.7111
2	.60	1.056	1.17	1.29	.56	1.02	1.13	1.24	1.75	1.20	1.31	1.42
3	.90	1.59	1.76	1.93	.84	1.52	1.69	1.86	1.13	1.80	1.97	2.13
4	1.20	2.12	2.34	2.57	1.12	2.03	2.26	2.49	1.51	2.40	2.62	2.84
5	1.50	2.64	2.93	3.21	1.40	2.54	2.82	3.11	1.89	3.00	3.28	3.56
6	1.80	3.17	3.51	3.86	1.68	3.05	3.39	3.73	2.26	3.60	3.93	4.27
7	2.09	3.70	4.10	4.50	1.96	3.55	3.95	4.35	2.64	4.20	4.58	4.98
8	2.39	4.23	4.68	5.14	2.24	4.06	4.52	4.97	3.02	4.80	5.25	5.69
9	2.69	4.75	5.27	5.79	2.52	4.57	5.08	5.59	3.40	5.40	5.90	6.40
10	2.99	5.28	5.86	6.43	2.80	5.08	5.65	6.22	3.77	6.00	6.56	7.11
11	3.29	5.81	6.40	7.07	3.08	5.59	6.21	6.84	4.15	6.60	7.21	7.81
12	3.59	6.34	7.03	7.71	3.37	6.09	6.78	7.46	4.53	7.20	7.88	8.52
13	3.89	6.87	7.61	8.36	3.65	6.60	7.34	8.08	4.90	7.80	8.53	9.23
14	4.19	7.40	8.20	8.10	3.93	7.11	7.90	8.70	5.28	8.40	9.17	9.94
15	4.49	7.92	8.78	9.64	4.21	7.62	8.47	9.32	5.66	9.00	9.82	10.66

*When not otherwise specified standard centers will be furnished, but when so mentioned the above indicated centers can be supplied on special order.

HEAT LOSSES FROM INDIRECT RADIATORS

STANDARD PIN

Cubic feet of air passing per sq. ft. of radiation	Increase in temperature of the air passing radiator	Pounds of steam condensed per sq. ft. of radiation	B.T.U. per sq. ft. per degree difference in temperature of air and steam
50	147	.125	.80
75	143	.170	1.17
100	140	.240	1.51
125	138	.295	1.85
150	135	.355	2.22
175	132	.410	2.57
200	130	.470	2.90
225	127	.530	3.25
250	123	.585	3.60
275	121	.645	3.90
300	119	.700	4.22

In school buildings and in buildings where the flues are of ample size the amount of air passing per square foot of radiating surface may be assumed to be 200 cubic feet per hour. In residences and buildings where the flues are usually small, the amount of air passing per square foot of surface per hour does not exceed 150 cubic feet.

NOTE: Above information is quoted from Notes on Heating and Ventilation by Professor Allen.

ASSEMBLING POSITION OF BOILER SECTIONS

STEAM OR WATER

Size 180 Series

184-F-*S-T-B
185-F-*S-M-T-B
186-F-*S-M-T-M-B
187-F-*S-M-M-T-M-B

220 Series

225-F-*S-M-T-B
226-F-*S-M-T-M-B
227-F-*S-M-M-T-M-B
228-F-*S-M-T-M-T-M-B

Size G270 Series

G-276-F-*S-M-T-M-B
G-277-F-*S-M-M-T-M-B
G-278-F-*S-M-T-M-T-M-B
G-279-F-*S-M-M-T-M-T-M-B

250 Series

255-F-T-M-T-B
256-F-T-M-M-T-B
257-F-T-M-T-M-T-B
258-F-T-M-M-T-M-T-B

230 Series

235-F-T-M-X-B
236-F-M-T-M-X-B
237-F-M-T-M-M-X-B
238-F-M-T-M-T-V-X-B
239-F-M-T-M-M-T-V-X-B
240-F-M-T-M-M-T-M-V-X-B

WN 270 Series

LEFT HAND		RIGHT HAND
B-X-M-M-T-F	WN276	F-A-R-M-V-B
B-X-M-M-M-M-F	WN277	F-A-R-M-T-V-B
B-X-V-M-M-M-M-F	WN278	F-A-R-M-T-V-V-B
B-X-V-M-T-M-M-M-F	WN279	F-A-R-M-M-T-V-V-B
B-X-V-M-M-T-M-M-M-F	WN280	F-A-R-M-M-M-T-V-V-B
B-X-V-M-M-T-M-M-M-M-F	WN281	F-A-R-M-M-M-M-T-V-V-B
B-X-V-V-M-M-T-M-M-M-M-F	WN282	F-A-R-M-M-M-M-T-V-V-V-B

KEY TO SECTIONS

F—Front.
A—Water Column Section.
S—Middle Special Tapped.
M—Middle.
T—Plain Tap.
R—Regular Tap (with ¾" Tap for Diaphragm).
X—Next To Back Tap.
V—Next To Back Middle.
B—Back.

CAPITOL-WINCHESTER—STEAM OR WATER

Dome Outer Hole Section, Fire Pot	Dome Outer Hole Section, Center Hole Section, Fire Pot	Dome Outer Hole Section, Center Hole Section, Outer Hole Section, Fire Pot	Dome Outer Hole Section, Center Hole Section, Outer Hole Section, Center Hole Section, Fire Pot
3130–4130	3140–4140	3350–4350	3460–4460
3230–4230	3240–4240	3450–4450	3560–4560
3330–4330	3340–4340	3550–4550	3660–4660
	3440–4440	3650–4650	
	3540–4540		
	3640–4640		

NOTE.—The names of parts arranged in order as placed in boiler from dome downward.

An Outer Hole Intermediate Section is always placed next to dome. When increasing or decreasing boilers place or remove section next to fire pot.

*S has return tapping on left hand side.

BLOWING OFF A STEAM BOILER

A STEAM boiler should be blown off within one week after it is in operation, to remove the unavoidable accumulation of oil, grease, etc., which have a tendency to cause foaming, preventing the generation of steam and causing an unsteady water line. This can only be done when the boiler is under pressure. If one blowing off does not result in a steady water line and clean gauge, the operation must be repeated a second, or if necessary, a third and fourth time.

1. Close all radiator valves, or, if the mains are valved, close both flow and return valves tightly, remove damper regulator and plug the opening.

2. Remove the safety valve and connect a blow-off pipe to the opening extending to suitable drain or out of the basement window. The size of this pipe should be the same as the safety valve and should be provided with full size cock.

3. With a wood fire and boiler filled to top of water glass raise steam pressure to fifteen pounds. Open cock in safety valve pipe, allowing pressure to cause water to be siphoned through this pipe, thus carrying away the surface grease and oil, and maintain the steam pressure at fifteen pounds. Supply cold water at the bottom of the boiler to maintain water line at the top of the gauge glass. After this operation has been continued for two hours close the upper blow-off cock and water supply and open blow-off at bottom of boiler, being careful that sufficient fire is carried to maintain a pressure until the last gallon of water is blown out.

4. Draw the remaining fire and open all fire and flue doors wide.

5. Allow the boiler to become cool, close blow-off, remove piping from safety valve opening, replace safety valve and damper regulator, and fill boiler slowly to normal water line.

6. Open radiator, flow and return valves.

7. Rebuild fire.

In boilers where a large amount of oil and grease is present it may be desirable to add a small quantity of soda ash, which should be boiled in boiler for half an hour before the blowing off operation is started.

Five pounds of soda ash for small sizes up to thirty pounds for the largest boilers, will usually be sufficient.

In cases where there is no water supply pressure the surface blowing-off cannot be a continuous operation. Therefore, the bottom blow-off should be repeated several times.

BASIS OF BOILER RATINGS

The rating of steam boilers is based upon a gauge pressure of 2 pounds at the boiler and the condensation of 0.25 pounds of steam per square foot of radiating surface standing in still air at 70 degrees.

The rating of water boilers is based upon water leaving the boiler at 180 degrees temperature and the transmission of 150 B. T. U.'s per square foot of radiating surface standing in still air at 70 degrees.

The above are accepted factors for direct cast iron radiation.

All other forms of radiating surface must be reduced to the equivalent of direct cast iron.

The square feet of surface in mains, branches and returns should be carefully determined and the condensation for steam or cooling effect for water expressed in equivalent of direct cast iron (See Table Below) and added to direct radiation. For ordinary house heating conditions a square foot of surface in mains is assumed to condense 0.30 pounds of steam per hour, owing to the character of cooling surfaces and relatively low basement temperatures. Piping having greater exposure will have a higher condensation. (See table, page 207).

A good pipe covering reduces the heat radiated from piping.

The condensation in indirect radiators depends on the temperature and volume of air entering the stack. Prof. Allen gives a value of 0.41 pounds when 175 cubic feet of air per square of surface is admitted at zero. (See table, page 203.)

Indirect radiating surface should be expressed in its equivalent of direct cast iron (See table below.)

When the pounds steam condensed per square foot per hour of any surface is known its equivalent in direct cast iron surface may be determined by multiplying the amount of surface in square feet by the factor corresponding to that condensing power, given in table below.

Condensing Power Lbs.	Factor	Condensing Power Lbs.	Factor	Condensing Power Lbs.	Factor
.20	.80	.30	1.20	.40	1.60
.21	.84	.31	1.24	.41	1.64
.22	.88	.32	1.28	.42	1.68
.23	.92	.33	1.32	.43	1.72
.24	.96	.34	1.36	.44	1.76
.25	1.00	.35	1.40	.45	1.80
.26	1.04	.36	1.44	.46	1.84
.27	1.08	.37	1.48	.47	1.88
.28	1.12	.38	1.52	.48	1.92
.29	1.16	.39	1.56	.49	1 96

HEAT TRANSMITTED PER HOUR PER SQ. FT. BY WROUGHT IRON PIPES IN STILL AIR

STEAM

T	219.4	219.4	219.4	219.4	219.4	219.4	219.4	219.4
T1	40	45	50	55	60	65	70	75
T2	179.4	174.4	169.4	164.4	159.4	154.4	149.4	144.4
H	358.8	348.8	338.8	328.8	318.8	308.8	298.8	288.8
W	.372	.361	.351	.341	.330	.320	.3095	.299
E	1.488	1.444	1.404	1.364	1.320	1.280	1.238	1.196

P—Gauge Pressure 2.3 lbs. for steam or 180° Temp. for water.
T—Temperature of Steam at 2.3 lbs. 219.4° or Temp. of water 180°.
T1—Temperature of surrounding air.
T2—Temperature difference of steam or water and air.
H—B. T. U. Transmitted per hour per sq. ft. (T2 x 2) for steam. (T2 x 1.8) for water.
L—Latent heat of steam at 2.3 lbs. press. 965.6 B. T. U.
W—Condensation in lbs. water H ÷ L.
K—Average B. T. U. transmitted per sq. ft. per hour per degree temperature difference. Difference taken as 2 for steam and 1.8 for water. These are conservative factors.
E—Equivalent in direct cast iron.

WATER

T	180	180	180	180	180	180	180	180
T1	40	45	50	55	60	65	70	75
T2	140	135	130	125	120	115	110	105
H	252	243	234	225	216	207	198	189
E	1.68	1.62	1.56	1.50	1.44	1.38	1.32	1.26

RISERS FOR HOT WATER

Floor	1	2	3	4	5	6
F	1.00	1.41	1.72	1.98	2.24	2.44

"F" is the percentage of increased surface a riser will carry due to head, taking first floor as one.

Mr. N. S. Thompson gives the following equalizing numbers, which represent relative capacities of different pipe sizes for the same friction pressure loss per hundred foot of run in mains and risers serving more than one radiator.

½ inch = 2 1¼ inch = 20 2½ inch = 110 4 inch = 380 7 inch = 1600
¾ inch = 5 1½ inch = 30 3 inch = 175 5 inch = 650 8 inch = 2250
1 inch = 10 2 inch = 60 3½ inch = 260 6 inch = 1050

Example:

one 4 inch = 380
one 5 inch = 650

1030

One 6 inch main would supply one 4 inch and one 5 inch.

TO DETERMINE BOILER CAPACITY REQUIRED TO HEAT SWIMMING POOL

L x W x D equals cubic feet. Where L equals the length of the pool in feet, W equals the width and D equals the average depth of the water.

From table, page 233, determine the number of pounds per cubic foot at initial temperature of the water. This quantity multiplied by the number of cubic feet gives the number of pounds of water to be heated.

Pounds of water multiplied by the difference between initial and final temperature equals B. T. U. to be supplied, and dividing by the number of hours allowed for heating gives number of B. T. U. required to be supplied per hour.

Divide B. T. U. required per hour by 150 to determine rating of water boiler, or by 240 to determine rating of steam boiler.

Note:—If quantity of water is given in gallons multiply by 8 1/3 (approximately 8 1/3 pounds to the gallon) to reduce it to pounds.

RELATIVE VALUE OF NON-CONDUCTORS

(C. E. EMERY)

Non-conductors	Value	Non-conductors	Value
Wool felts	1.000	Loam, dry and open	.550
Mineral wool, No. 2	.832	Slacked lime	.480
Mineral wool, with tar	.715	Gas-house carbon	.470
Sawdust	.680	Asbestos	.363
Mineral wool, No. 1	.676	Coal ashes	.345
Charcoal	.632	Coke, in lumps	.277
Pine wood, across fibre	.553	Air space, undivided	.186

TABLE OF MAINS AND BRANCHES

Main	Branch	
1 -in. will supply 2		¾-in.
1¼-in. will supply 2		1 -in.
1½-in. will supply 2		1¼-in.
2 -in. will supply 2		1½-in.
2½-in. will supply 2	1½-in. and 1	1¼-in. and 1	1½-in.
3 -in. will supply 1	2½-in. and 1	2 -in. or 2	2 -in. and 1	1½-in.
3½-in. will supply 2	2½-in. or 1	3 -in. and 1	2 -in. or 3	2 -in.
4 -in. will supply 1	3½-in. and 1	2½-in. or 2	3 -in. or 4	2 -in.
4½-in. will supply 1	3½-in. and 1	3 -in. or 1	4 -in. and 1	2½-in.
5 -in. will supply 1	4 -in. and 1	3 -in. or 1	4½-in. and 1	2½-in.
6 -in. will supply 2	4 -in. and 1	3 -in. or 4	3 -in. or 10	2 -in.
7 -in. will supply 1	6 -in. and 1	4 -in. or 3	4 -in. and 1	2 -in.
8 -in. will supply 2	6 -in. and 1	5 -in. or 5	4 -in. and 2	2 -in.

TABLE FOR PROPORTIONING SINGLE PIPE STEAM MAINS

Square Feet Radiation	Total Length of Main in Feet						
	20	40	75	100	150	200	Return
	Diam., Inches	Diam., Inches	Diam.. Inches	Diam., Inches	Diam., Inches	Diam., Inches	Diam . Inches
100	1½	1½	1½	1½	1½	2	1
200	1½	1½	2	2	2	2	1¼
300	2	2	2	2	2	2½	1¼
400	2	2	2½	2½	2½	2½	1¼
500	2½	2½	2½	3	3	3	1¼
600	2½	3	3	3	3	3½	1½
700	2½	3	3	3	3½	3½	1½
800	3	3	3	3	3½	3½	1½
1000	3	3½	3½	3½	3½	4	2
1200	3½	4	4	4	4	4	2
1400	3½	4	4	4	4	5	2
1600	4	4	4	5	5	5	2½
1800	4	5	5	5	5	5	3
2000	4	5	5	5	5	5	3
2500	5	5	5	5	6	6	3
3000	5	5	6	6	6	6	3
3500	5	6	6	6	6	7	3
4000	6	6	6	7	7	7	3½
5000	7	7	7	8	8	8	4
6500	8	8	8	9	9	9	5

Reduce all radiating surface to equivalent In-direct surface

COMBUSTION

Combustion as used in steam engineering signifies a rapid chemical combination between oxygen and the carbon, hydrogen and sulphur composing the various fuels. This combination takes place usually at high temperature with evolution of light and heat. The substance combining with the oxygen is known as combustible and if it is completely burned the resultant gas is carbon dioxide (CO_2). If the combustion is imperfect carbon monoxide (CO) is formed. The temperature at which the reaction begins to take place is known as the kindling temperature and is different for each combustible. The following values are from Stromeyer:

Kindling Temperatures

Lignite Dust	300F
Dried Peat	435F
Sulphur	470 F
Anthracite Dust	570 F
Coal	600F
Coke	Red heat
Anthracite	Red heat— 750
Carbon monoxide	Red heat —1211
Hydrogen	1030—1290

A flue gas analysis gives the proportion by volume of the principal constituent gases produced by the combustion of any fuel. The gases usually determined in such an analysis are carbon dioxide (CO_2), oxygen (O), and carbon monoxide (CO), while the residue or volume remaining after these gases are removed is taken as nitrogen. Carbon monoxide is very difficult to determine and may be present when not indicated by an Orsat apparatus.

Complete combustion of 1 pound of pure carbon will give a resultant gas containing 20.91% CO_2 and 79.09% N., the oxygen having all entered into combination with the carbon and the new gas resulting has simply taken the place of the original 20.91% oxygen. Now if 50% excess air is supplied only 2/3 of the original oxygen volume will be replaced by CO_2 and the flue gas analysis will show 13.91% CO_2, 7% oxygen and 79.91% nitrogen.

AIR REQUIRED FOR COMBUSTION

The calculations of the theoretical amount of air required for combustion presupposes that each and every particle of oxygen can be brought into intimate contact with the combustible. Practically this is impossible, due to the large amount of inert nitrogen present, variations in fuel bed, and interference of clinkers and ash, which cannot be removed as soon as formed. It is, therefore, necessary to provide for an excess of air when burning coal under natural draft, amounting to approximately 50% to 100% of the theoretical amount, or about 18 to 24 lbs. per pound of coal.

Less air results in imperfect combustion and smoke, while an excess cools the fire and boiler and carries away large quantities of heat in the flue gases. Harding & Willard give the following table of theoretical quantities of air required per pound of fuel as a basis for comparison:

COMBUSTION

Continued

Fuel	Composition By Weight			Lbs. of Air Per lb. of Fuel
	%C	%H	%O	
Wood Charcoal	93			11.16
Peat Charcoal	80			9.6
Coke Charcoal	94			10.8
Anthracite Coal	91.5	3.5	2.6	11.7
Bituminous Coal, Dry	87	5.0	4.–	11.6
Lignite	70	5.0	20.–	8.9
Peat, Dry	58	6.0	31.–	7.68
Wood, Dry	50	6.0	43.5	6.00
Mineral Oil	85	13.–	1.–	1.43

A large grate area and an insufficient draft are a bad combination because it is impossible to maintain good combustion over the entire area of the grate.

One pound of carbon in burning to CO_2 requires 2.66 pounds of oxygen or 2.66 ÷ 0.2315 = 11.52 pounds of dry air. 0.2315 is the percentage of oxygen by weight in one pound of air. It may be shown in a similar manner that one pound of hydrogen requires 34.56 pounds of dry air, 8 ÷ 0.2315 = 34.56. One pound of sulphur requires 4.32 pounds of dry air, 1 ÷ 0.2315 = 4.32. Since the combustible portion of all commercial fuels consists chiefly of carbon-hydrogen and sulphur, the theoretical air requirements may be approximated from the fuel analysis as follows:

$$A = 11.52\ C + 34.56\ (H - \frac{O}{8}) + 4.32\ S, \text{ in which}$$

A = Weight of dry air required per pound of fuel, pounds.

C, H, O and S = Proportional part of dry weight of carbon, hydrogen, oxygen and sulphur in the fuel.

$\frac{O}{8}$ = Proportional part of the hydrogen supplied with oxygen from the fuel itself.

The above equation is commonly written:

$$A = 34.56 \left\{ \frac{C}{3} + (H - \frac{O}{8}) + \frac{S}{8} \right\}$$

The following example shows the application of the above formula:

Given—	Per Cent
Carbon	80
Hydrogen	4
Oxygen	3
Sulphur	1.5
Moisture	5
Non-combustible	6.5

Calculation—

Substituting the values of C, H, O and S in the equation

$$A = 11.52 \times 0.80 + 34.56 \left(0.04 - \frac{0.03}{8}\right) + 4.32 \times 0.015 = 10.5$$

pounds, the theoretical weight of dry air necessary to burn one pound of coal as fired.

Since the coal contains 5 percent of moisture, the weight of dry air required to burn one pound of dry coal of the given analysis =

$$\frac{10.5}{0.95} = 11.08$$

As water is treated as incombustible, the total incombustible in the analysis becomes 11.5 percent. Therefore, the air required per pound of combustible is

$$\frac{10.5}{88.5} = 11.87 \text{ pounds.}$$

CHIMNEYS

Draft is the difference in pressure which causes the flue gases to rise in a chimney. If the gas inside a stack be heated, each cubic foot of it will expand, hence its weight will be less than a cubic foot of colder outside air or gas. Therefore the unit pressure at the base of the chimney, due to the column of heated gas, will be less than that due to a column of cold air or gas of the same height on the outside of the chimney.

A chimney having height H is filled with gas at temperature t_2. If the chimney had sufficient additional height filled with hot gas at temperature t_2 added to the column in the chimney, this heated gas would just balance a column of air of equal cross section at temperature t_1 and height H. In practice this additional column of hot gas is lacking, hence the above system is unbalanced and the flow occurs into the base of chimney in virtue of the difference in head.

This difference in pressure, like the difference in head of water causes a flow of cold air or gas into the base of the chimney. If, just at the point of entrance into the chimney the cold incoming air is warmed up to the chimney temperature, the chimney will always be full of hot gas and the draft action will be continuous.

The difference in pressure or intensity of draft is usually measured in inches of water by means of a U-tube water gauge.

As draft measurements are taken along the path of the gases, the intensity grows less as the points at which the readings are taken are farther from the stack until in the boiler ashpit, with the ashpit doors open for freely admitting the air, there is little or no preceptible rise in the water of the gauge. The breeching, the boiler damper, the boiler flues and the coal on the grates,—all retard the passage of the gases and the draft from the chimney is required to overcome the resistance offered by these various factors. The draft in the smokehood may be 0.2 inches, while in the firebox it may be not over 0.08, the difference being the draft required to overcome the resistance offered in forcing the gases through the boiler.

One of the most important factors to be considered in determining the loss of draft is the pressure required to force the air for combustion through the bed of fuel on the grates. This pressure will vary with the nature of the fuel used.

The theoretical velocity of the flue gases rising in the chimney may be determined from the table page 218, assuming an average draft intensity of 0.003 inches of water per foot of chimney.

It is found in practice that the above theoretical velocity is never obtained due to friction and other causes. William Kent assumes a layer of gas two inches in thickness as lining the chimney and reducing its effective area by that amount. In this case the calculated velocity should be assumed to be effective over the net area remaining, giving chimney efficiencies varying from 25 to 50 percent, the lower velocities being obtained on small residence flues and the higher velocities on large flues.

Intensity of draft determines the velocity of flow through chimney but cross sectional area must be sufficient to pass the necessary volume of gas if the chimney is to have proper capacity. When the amount of air required for combustion is determined and the intensity of draft is known, the required cross sectional area can be calculated. An actual case is given below.

Given data:

10.3 pounds of coal burned per hour
450° smokehood temperature
35 ft. height of chimney

Calculation:

Assume the actual amount of air required for combustion one hundred percent more than the theoretical, or 24 pounds of air per pound of coal.

$$\frac{10.3 \times 24}{0.0807} = 3{,}063 \text{ cu. ft. per hour at } 32°$$

0.0807 equals weight of gas or air per cubicf oot at 32°. Since volume of gas increases in proportion to absolute temperature, the following correction must be made.

$$3{,}063 \times \frac{910}{492} = 5{,}665 \text{ cu. ft. of flue gas which chimney must receive at smokehood temperature.}$$

Where $910 = 460° + 450°$ and $492 = 460° + 32°$ 460 being the number of degrees it is necessary to add to the Fahrenheit temperature scale to give absolute temperatures.

$0.003 \times 35 = 0.105$ draft in inches of water.

Velocity corresponding to a draft of 0.105 inches of water determined from table page 218 is 15.36 feet per second.

$15.36 \times 3600 \times 0.25 = 13{,}825$—velocity of gases in feet per hour where 25% is the assumed efficiency of the chimney.

5,665 = 0.41 sq. ft. of cross sectional area

13,825

0.41 x 144 = 59 sq. in.

The proper size of chimney for heating boilers of given capacity may be calculated on the basis of air required for combustion and frictional resistances to be overcome, and careful consideration of local conditions. Prof. Wm. Kent gives a formula which is approved by Prof. R. C. Carpenter, and from which has been compiled the following table which we believe heating engineers will find of considerable assistance in selecting chimney flues. This table give. the diameter of round chimneys in inches for various heights. Square chimneys with sides equal to the diameter are considered equivalents

CHIMNEY FLUES

Steam *Square Feet Rated Boiler Capacity	Water *Square Feet Rated Boiler Capacity	Height of Chimney in Feet					
		30	40	50	60	80	100
250	375	7.0	....	....	....	....	....
500	750	9.2	8.8	8.2	....	....	....
750	1,125	10.8	10.2	9.6	9.3	8.8	8.5
1,000	1,500	12.0	11.4	10.8	10.5	10.0	9.5
1,500	2,250	14.4	13.4	12.8	12.4	11.5	11.2
2,000	3,000	16.3	15.2	14.5	14.0	13.2	12.6
3,000	4,500	18.5	18.2	17.2	16.6	15.8	15.0
4,000	6,000	22.2	20.8	19.6	19.0	17.8	17.0
5,000	7,500	24.6	23.0	21.6	21.0	19.4	18.6
6,000	9,000	26.8	25.0	23.4	22.8	21.2	20.2
7,000	10,500	28.8	27.0	25.5	24.4	23.0	21.6
8,000	12,000	30.6	28.6	26.8	26.0	24.2	23.4
9,000	13,500	32.4	30.4	28.4	27.4	25.6	24.4
10,000	15,000	34.0	32.0	30.0	28.6	27.0	25.4

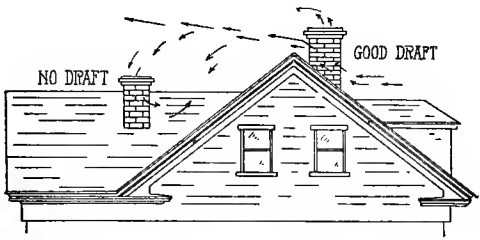
*See Basis of Boiler Ratings page 206.

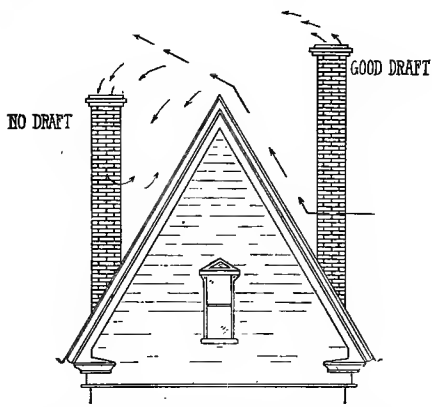
It is necessary that the area and height, thickness of walls, general structure, and the position of the outlets with reference to building and other buildings nearby should be carefully noted and observed in selecting or building a flue. Rectangular shapes should never have a difference in width and length more than the ratio of 2 . 1. No flue should be less than 8 x 8 inside diameter, and not less than 30 feet in height.

A chimney may have sufficient area and height and still fail to give satisfactory results if certain details of construction are not carefully observed.

The building in which a heater is to be placed should be carefully examined, or if the fitter is figuring from the plans, great care should

be taken to ascertain accurately just what kind of a chimney such plans provide. It should be of proper size and of sufficient height to insure a good draft.





Above illustrations show the location and height of chimneys on a house tending to make a good and poor draft. A little care and attention to the conditions will save much trouble.

Chimneys which make a turn to go around a fire-place, or which are offset from a vertical position will almost always prove defective unless care is exercised to make the offset very smooth and the area of the chimney larger than if flue be carried "straight up."

The chimney-top should run above the highest part of the roof at least four feet.

The chimney should extend above any surrounding buildings or other obstructions which might cause down air currents.

The chimney should be set on inside wall if possible. If set on outside walls the chimney breast should extend on the inside of the house in preference to extending outside. This is for the reason

that the heat radiating from the chimney reduces the intensity of draft.

Short bends for offsets should be avoided.

Enlargement at base or increased cross sectional area of chimney should be avoided.

Chimney caps should not restrict the area. If extension or patent draft accelerators are used, they should have a free area equal to the area of the chimney.

If the flue is tile lined the joints must be well cemented or all space between the tile and brick work filled in tightly.

If the flue is made of brick the outside walls should be at least 8 inches thick to insure safety. The inside joints should be well struck, each course should be well bedded and free from surface mortar at the joints. The exposed brick at the top of chimney should be laid in cement mortar to prevent cutting out of the joints.

Cement Block chimneys having flues of single blocks have in most cases given insufficient draft. The outside walls of flues are only 2 inches to 2½ inches thick and cause chilling of inside air. Then, too, the difference in inside and outside temperature because of block construction causes the thin walls to check or crack a number of times in each block allowing air leakage. Usually a course mixture is used for body of block and only a fine thin mixture for outside facing. This also permits air leakage.

The boiler flue should have no other openings either above or below the boiler smoke pipe, special care being exercised at the base of the flue to prevent any connection between it and the soot pocket of any other flue.

If a chimney contains more than one flue the dividing wall must be carried from the bottom to the top so that each flue is independent of the other throughout its entire length.

When tile linings are used the net inside area should be considered as the size of the chimney flue.

Long smoke pipes should be avoided wherever possible. When they are necessary great care should be taken to see that joints are made tight. Where the smoke pipe fits the smokehood and enters the chimney the joints should be made tight with boiler putty or asbestos cement.

In case it is necessary to have a long smoke pipe from the heater to the chimney, great care is necessary to prevent loss of heat. Such a smoke pipe should be one or two inches larger than regular and should have an upward grade to chimney. It should have a good coating of asbestos covering, and there should be as few turns in the pipe as possible.

Smoke pipe should not extend into the flues beyond the inside surface of the lining, otherwise the end of the pipe cuts down the area of the flue.

Round tile linings are rated by inside dimensions. Rectangular linings are rated by outside dimensions.

FIRE CLAY FLUE LININGS

Nominal Size Inches	Actual Outside Inches	Actual Inside Inches	Area Square Inches	Weight per 1 ft. Lbs.
		Rectangular		
7 x 7	7¼ x 7¼	5¾ x 5¾	33.07	15
8½ x 8½	8½ x 8½	7¼ x 7¼	52.6	20
8½ x 13	8½ x 13	6⅞ x 11⅝	79.9	29
13 x 13	13 x 13	11¼ x 11¼	126.6	42
13 x 18	13 x 18	10¾ x 15¾	169.3	58
18 x 18	18 x 18	15½ x 15½	240.2	74
		Round		
7	8½	7	38.48	16
8	9	8	50.26	22
9	10½	9	63.61	26
10	12	10	78.54	30
12	14	12	113.1	45
15	17⅛	15	176.71	60
18	20⅞	18	254.47	80
20	23	20	314.16	90
24	27	24	452.39	130
30	35	30	706.86	230

ROBINSON CLAY PRODUCTS COMPANY.

DRAFT GUAGE

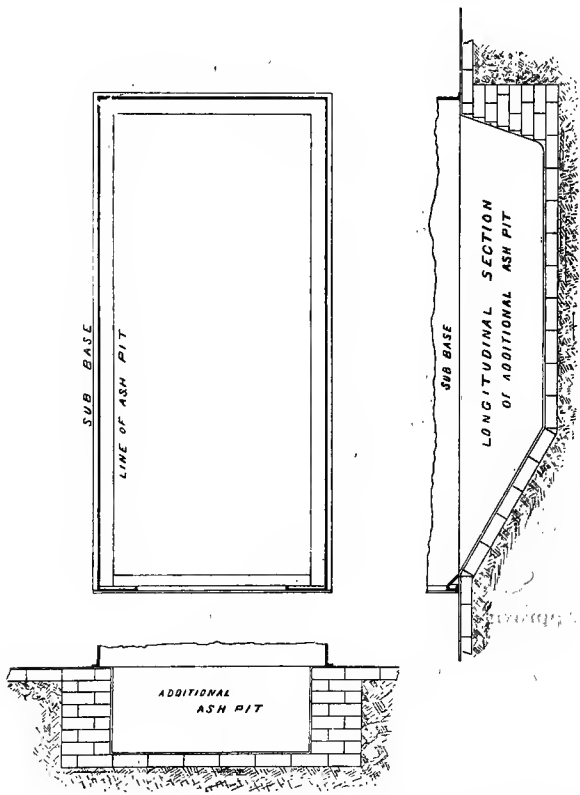
The U-Tube Water Gauge is the most commonly used appliance to determine the strength of draft. It is inexpensive, simple in construction and easily operated. Providing the area of flue is ample for proper volume, .12 to .15 inches of water is sufficient for small, and .15 to .2 inches for large installations. The air in flue should be warmed when the gauge is used.

The chimney flue may have area given in table, and, still, because of variations in form or construction, have insufficient intensity, resulting in an excessive consumption of fuel.

Height Water Inches	Pressure per Pound	Velocity Feet per Second	Velocity Feet per Minute	Height Water Inches	Pressure per Pound	Velocity Feet per Second	Velocity Feet per Minute
.10	.521	15.05	903	1.10	5.731	49.90	2994
.15	.781	18.17	1090	1.15	5.991	57.00	3060
.20	1.042	21.30	1278	1.20	6.252	52.10	3126
.25	1.302	23.05	1090	1.25	6.512	53.20	3189
.30	1.563	26.06	1564	1.30	6.773	54.20	3252
.35	1.823	28.08	1685	1.35	7.033	55.30	3315
.40	2.084	30.10	1806	1.40	7.294	56.30	3378
.45	2.344	31.76	1911	1.45	7.554	57.40	3415
.50	2.605	33.60	2016	1.50	7.815	58.20	3492
.55	2.865	35.20	2112	1.55	8.075	59.30	3523
.60	3.126	36.80	2208	1.60	8.336	60.20	3612
.65	3.386	38.30	2298	1.65	8.596	61.30	3666
.70	3.647	39.80	2388	1.70	8.857	62.00	3720
.75	. .	41.20	2469	1.75	9.117	63.10	3774
.80	4.168	42.50	2550	1.80	9.378	63.80	3828
.85	3.907	43.80	2628	1.85	9.638	64.90	3882
.90	4.689	45.10	2706	1.90	9.899	65.60	3936
.95	4.949	46.30	2778	1.95	10.159	66.70	3987
1.00	5.210	47.50	2850	2.00	10.420	67.30	4038

FOUNDATIONS

IN setting heating boilers, either round or square, the contractor should first note that the foundation is level and firm. A space left underneath the base allows the air to draw in ashpit, the same as when the draft door is open. This air leakage accounts for the large consumption of fuel often found in residence heating boilers.



As about 95 per cent of all burned out grate bars are directly traceable to the accumulation of ashes under grates, it will be found of much value, when the conditions will permit, to deepen the ashpit by either making a raised foundation of brick under edge of boiler. or by excavating and cementing the sides and ends, as shown by the illustration above.

FUELS AND COMBUSTION

Fuels are generally classified as solid, liquid, and gaseous.

Solid fuels are coal, wood, and wastes.

Liquid fuels are petroleum, and its products.

Gaseous fuels are natural and artificial gas.

The formation of coal is briefly described in "Steam," Babcock and Wilcox Co., as follows:

"All coals are of vegetable origin and are the remains of prehistoric forests. Destructive distallation, due to great pressures and temperatures, has resolved the organic matter into its invariable ultimate constituents, carbon, hydrogen, oxygen and other substances, in varying proportions. The factors of time, depth of beds, disturbance of beds and the intrusion of mineral matter resulting from such disturbances have produced the variation in the degree of evolution from vegetable fiber to hard coal. This variation is shown briefly in the content of carbon, and Table 1 shows the steps of such variation.

COMPOSITION OF COAL

The uncombined carbon in coal is known as fixed carbon. Some of the carbon constituent is combined with hydrogen and this, together with other gaseous substances driven off by the application of heat, form that portion of the coal known as volatile matter. The fixed carbon and the volatile matter constitute the combustible. The oxygen and nitrogen contained in the volatile matter are not combustible, but custom has applied this term to that portion of the coal which is dry and free from ash, thus including the oxygen and nitrogen."

TABLE 1

Approximate Chemical Changes from Wood Fiber to Anthracite Coal

Substance	Carbon	Hydrogen	Oxygen
Wood Fiber	52.65	5.25	42.10
Peat	59.57	5.96	34.47
Lignite	66.04	5.27	28.69
Earthy Brown Coal	73.18	5.68	21.14
Bituminous Coal	75.06	5.84	19.10
Semi-Bituminous Coal	89.29	5.05	5.66
Anthracite Coal	91.58	3.96	4.46

Coals may be classified according to the percentages of fixed carbon and volatile matter contained in the combustible. Wm. Kent gives the following classification:

TABLE 2

Name of Coal	Per Cent of Fixed Carbon	Combustible Volatile Matter	B. t. u. per pound of combustible
Anthracite.....	97 to 92.5	3.0 to 7.5	14,600 to 14,800
Semi-Anthracite...	92.5 to 87.5	7.5 to 12.5	14,700 to 15,500
Semi-Bituminous..	87.5 to 75.0	12.5 to 25.0	15,500 to 16,000
Bituminous, East..	75.0 to 60.0	25.0 to 40.0	14,800 to 15,300
Bituminous, West..	65.0 to 50.0	35.0 to 50.0	13,500 to 14,800
Lignite.....	50.0 & under	50.0 & over	11,000 to 13,500

The non-combustible constituents are the ash and moisture, the former varying from 3% to 30% and the latter from 0.75 to 25% of the total weight, depending on grade and locality where mined. A large percentage of ash is undesirable as it not only reduces the calorific value of the fuel, but chokes up the air passages in the boiler and through the fuel bed, thus preventing the rapid combustion necessary to high efficiency. If the coal contains an excessive quantity of sulphur, trouble will result from its harmful action on the metal of the boiler where moisture is present, and because it unites with the ash to form a fusible slag or clinker which will choke up the grate bars and form a solid mass in which large quantities of unconsumed carbon may be imbedded.

Moisture in coal may be more detrimental than ash in reducing the temperature of a furnace, as it is non-combustible, absorbs heat both in being evaporated and superheated to the temperature of the boiler gases. In some instances, however, a certain amount of moisture in a bituminous coal produces a mechanical action that assists in the combustion and makes it possible to develop higher capacities than with dry coal.

General characteristics of hard and soft coals. The former contain fixed or uncombined carbon in large proportion, whereas the latter have an increasing percentage of carbon in combination with hydrogen, or hydrocarbon which is volatile, and will distill off under high temperature, producing smoke. Hard coal usually contains more ash, especially in the smaller sizes.

Anthracite or hard coal, ignites slowly, but when in a state of incandescence its radiant heat is very great. Its flame is very short and of a yellowish blue tinge and it can be burned with practically no smoke. This coal does not swell when burned although it contains from 3 to 7.5% of volatile matter.

True or dry anthracite is characterized by few joints and clefts, and their squareness; great relative hardness and density; high specific gravity, ranging from 1.4 to 1.8, and semi-metallic lustre.

Anthracite is classed and marketed according to graded sizes as follows:

TABLE 3

Names and Sizes of Anthracite or "Hard" Coal

Names of Sizes	Will pass through		Will not pass through	
Grate	4 " square	4½" round	2¾" square	3⅛" round
Egg	2¾" "	3⅛" "	2 " "	2¼" "
Stove	2 " "	2¼" "	1⅜" "	1 9/16" "
Nut	1⅜" "	1 9/16" "	¾" "	7/8" "
Pea	¾" "	7/8" "	½" "	9/16" "
Buckwheat #1	½" "	9/16" "	¼" "	5/16" "
Rice #2	¼" "	5/16" "	⅛" "	3/16" "
Barley #3	⅛" "	3/16" "		3/32" "

The anthracite coals are, with some unimportant exceptions, confined to five small fields in Eastern Pennsylvania.

Semi-Anthracite coal kindles more readily, due to its higher content of volatile combustible, and burns more rapidly than anthracite. It has less density, hardness and metallic lustre than anthracite, and the average specific gravity is about 1.4.

This coal is found in the western part of the anthracite field in a few small areas.

Semi-Bituminous coal, is softer than anthracite or semi-anthracite, contains more volatile hydrocarbon and will kindle more easily and burns more rapidly. It is usually free burning and due to its high calorific value very desirable for steam generation purposes.

This coal is found in Pennsylvania, Maryland, Virginia, W. Virginia and Tenessee.

Bituminous coals are still softer than those described and contain still more of the volatile hydrocarbons. The difference between the semi-bituminous and the bituminous coals is an important one, economically. The former have an average heating value per pound of combustible about 6 per cent higher than the latter, and they burn with much less smoke in ordinary boilers. The distinctive characteristic of the bituminous coals is the emission of yellow flame and smoke when burning. In color they range from pitch black to dark brown, having a resinous luster in the most compact specimens, and a silky luster in such specimens as show traces of vegetable fiber. The specific gravity is ordinarily about 1.3

Bituminous coals are either of the caking or non-caking class. The former, when heated, fuse and swell in size; the latter burn freely, do not fuse, and are commonly known as free burning coals. Caking coals are rich in volatile hydrocarbons and are valuable in gas manufacture.

Bituminous coals absorb moisture from the atmosphere. The surface moisture can be removed by ordinary drying, but a portion of the water can be removed only by heating the coal to a temperature of about 250 degrees Fahrenheit.

Table 4

Names and Sizes of Bituminous or "Soft" Coal

For "Domestic" soft coals there are no uniform names and sizes; but they are marketed in the various states under about these classes:

"Screenings" usually smallest sizes.

"Duff" goes through ⅛ in. screen.

"No. 3 Nut" goes through 1¼ in. screen, over ¾ in. screen.

"No. 2 Nut" goes through 2 in. screen, over 1¼ in. screen.

"No. 1 Domestic Nut" goes through 3 in. screen, over 1½ or 2 in. screen.

"No. 4 Washed" goes through ¾ in. screen, over ¼ in. screen.

"No. 3 Washed Chestnut" goes through 1¼ in. screen, over ¾ in. screen.

"No. 2 Washed Stove" goes through 2 in. screen, over 1¼ in. screen.

"No. 1 Washed Egg" goes through 3 in. screen, over 2 in. screen.

"No. 3 Roller Screened Nut" goes through 1½ in. screen, over 1 in. screen.

"No. 2 Roller Screened Nut" goes through 2 in. screen, over 1½ in. screen.

"No. 1 Roller Screened Nut" goes through 3½ in. screen, over 2 in. screen.

"Egg" goes through 6 in. over 3 in. screen.

"Lump" or "Block" goes through 6 in. screen, or over.

"Run-of-Mine" in fine and large lumps.

POCAHONTAS SMOKELESS: Generally sized as: "Nut," "Egg," "Lump," and "Mine-Run."

Bituminous coal is far more generally distributed than any of the other coals, being found in the Appalachian field in the states of Pennsylvania, West Virginia, Maryland, Virginia, Ohio, Kentucky, Tennessee and Alabama; a field nearly 900 miles in length. The Eastern Interior field includes Michigan, all of Illinois, and parts of Indiana and Kentucky. The Western field includes Iowa, Missouri, Kansas, Oklahoma, Arkansas and Texas. The Rocky Mountain fields include parts of Montana, Wyoming, Colorado, Utah and New Mexico. The Pacific Coast fields are limited to small areas in California, Oregon, and Washington.

Cannel coal is a variety of bituminous coal, rich in hydrogen and hydrocarbons, and is exceedingly valuable as a gas coal. It has a dull resinous luster and burns with a bright flame without fusing. Cannel coal is seldom used for steam coal, though it is sometimes mixed with semi-bituminous coal where an increased economy at high rates of combustion is desired. The composition of cannel coal is approximately as follows: fixed carbon, 26 to 55 per cent; volatile matter, 42 to 64 per cent; earthy matter, 2 to 14 per cent. Its specific gravity is approximately 1.24.

Names and Sizes of Cannel Coal: For fireplace—"Hand Picked Lump;" for stoves: "Egg."

Lignite is organic matter in the earlier stages of its conversion into coal, and includes all varieties which are intermediate between peat and coal of the older formation. Its specific gravity is low, being 1.2 to 1.23, and when freshly mined it may contain as high as 50 per cent of moisture. Its appearance varies from a light brown, showing a distinctly woody structure, in the poorer varieties, to a black, with a pitchy lustre resembling hard coal, in the best varieties. It is non-caking and burns with a bright but slightly smoky flame with moderate heat. It is easily broken, will not stand much handling in transportation, and if exposed to the weather will rapidly disintegrate, which will increase the difficulty of burning it.

Its composition varies over wide limits. The ash may run as as low as one per cent and as high as 50 per cent. Its high content of mositure and the large quantity of air necessary for its combustion cause large stack losses. It is distinctly a low-grade fuel and is used almost entirely in the districts where mined, due to its cheapness.

Lignites resemble the brown coals of Europe and are found in the western states, Wyoming, New Mexico, Arizona, Utah, Montana, North Dakota, Nevada, California, Oregon and Washington. Many of the fields given as those containing bituminous coals in the western states also contain true lignite. Lignite is also found in the eastern part of Texas and in Oklahoma.

Coke is a porous product consisting almost entirely of carbon remaining after certain manufacturing processes have distilled off the hydrocarbon gases of the fuel used. It is produced, first, from gas coal distilled in gas retorts; second, from gas or ordinary bituminous coals burned in special furnaces called coke ovens; and third, from petroleum by carrying the distillation of the residuum to a red heat.

Coke is a smokeless fuel. It readily absorbs moisture from the atmosphere and if not kept under cover its moisture content may be as much as 20 per cent of its own weight.

Gas-house coke is generally softer and more porous than oven coke, ignites more readily, and requires less draft for its combustion.

Names and sizes of Domestic By-Product Coke: "Egg" 3 in—2½ in. "Large Stove" 2½ in.—2 in. "Small Stove" 2 in.—1½ in. "Nut" 1½ in.—¾ in. "Pea" ¾ in.—½ in.

The **analysis of a coal** should be ascertained if possible. The actual composition of any coal is determined by an **ultimate** chemical analysis, which can only be made by an experienced chemist.

The **ultimate analysis** of a fuel gives the percentage by weight of the various elements composing same. Such an analysis is usually reported on the dry sample as 100%, and the percentage of moisture in the original sample given separately.

The true analysis is easily obtained by dividing each reported percentage by 100 + % H_2O in original sample as indicated in the following:

Table 5

Constituent	Chemists Report (based on dry fuel)	True Analysis (fuel as received)
Carbon	76.71%	72.52%
Hydrogen	5.07%	4.78%
Oxygen	8.65%	8.156%
Nitrogen	1.16%	1.09%
Sulphur	1.21%	1.14%
Ash	7.00%	6.60%
	100%	
Moisture	6.06%	5.714%
	106.06%	100.00%

The **proximate analysis** of a fuel gives the percentage by weight of the fixed carbon, volatile matter, moisture and ash.

The **heat of combustion or calorific value** of a fuel is the number of B. T. U. evolved when 1 pound of the fuel is completely burned in air or oxygen.

A **calorimeter** is used to determine the heat generated by the combustion of a known weight of the fuel, and this heat reduced to a pound basis. In the case of a solid or liquid fuel a **bomb calorimeter** is employed, and the standard apparatus in use at the present time is that devised by M. Pierre Mahler.

TABLE 6

Composition and Heat Values of Anthracite Coals

Locality	Fixed Carbon	Volatile	Moisture	Ash	Sulphur	B. t. u. per Lb. of Dry Coal
Anthracite						
Pennsylvania	78.60	.....	.....	14.80	0.40	.....
Pennsylvania Buckwheat	81.32	3.84	3.88	10.96	0.67	12,200
Pennsylvania, Wilkesbarre	76.94	6.42	1.34	15.30	.....	11,801
Pennsylvania Scranton	79.23	3.73	3.33	13.70	.....	12,149
Pennsylvania, Scranton	84.46	5.37	0.97	9.20	.....	12,294
Pennsylvania Cross Creek	89.19	1.96	3.62	5.23	.....	13,723
Pennsylvania Lehigh Valley	75.20	7.36	1.44	16.00	.....	12,423
Pennsylvania, Lykens Valley	76.94	6.21	.....	.....	.....	15,300
Pennsylvania, Lykens Valley	81.00	5.00	.....	.....	.....	15,300
Pennsylvania, Wharton	86.40	3.08	3.71	6.22	0.58	15,000
Pennsylvania, Buck Mt	82.66	3.95	3.04	9.88	0.46	15,070
Pennsylvania, Beaver Meadow	88.94	2.38	1.50	7.11	1.01	.....
Pennsylvania, Lackawanna	87.74	3.91	2.12	6.35	0.12	.....
Rhode Island	85.00	.....	.....	7.00	0.90	.....
Arkansas	74.49	14.73	1.52	9.26	.....	13,217
Semi-Anthracite						
Pennsylvania, Loyalsock	83.34	8.10	1.30	6.23	1.03	15,400
Pennsylvania, Bernice	82.52	3.56	0.96	3.27	0.24	15,050
Pennsylvania, Bernice	89.39	8.56	0.97	9.34	1.04	15,475
Pennsylvania, Wilkesbarre	88.90	7.68	.....	3.49	.....	14,199
Pennsylvania, Lycoming Creek	71.53	13.84	0.67	13.96	0.03	.....
Virginia, Natural Coke	75.08	12.44	1.12	11.38	0.47	.....
Arkansas	74.06	14.93	1.35	9.66	.....	.....
Indian Territory	73.21	13.65	5.11	8.03	1.18	13,662
Maryland, Easby	83.60	16.40	.....	.....	.....	11,207

TABLE 7

Composition and Heat Values of Bituminous Coals

State	County	Fixed Carbon	Volatile Matter	Moisture	Ash	B. T. U.'s per Lb.
Alabama	Bibb	52.09	28.56	6.43	12.92	12395
	Jefferson	63.90	26.16	3.23	6.71	14074
Arkansas	Sebastian	66.57	16.27	5.47	11.69	12690
	Johnson	72.88	12.68	2.36	12.08	13259
	Ouachita	24.37	26.49	39.43	9.71	6356
Colorado	Boulder	40.45	34.88	18.68	5.99	10143
	Garfield	54.10	33.00	4.80	8.10	12060
	Las Animas	53.36	28.37	1.44	16.83	12726
Illinois	St. Clair	39.42	35.70	11.69	13.19	10699
	Saline	50.27	33.54	7.81	8.38	12418
	Williamson	46.59	32.26	8.20	12.95	11362
Indiana	Greene	46.20	32.07	13.58	8.15	11419
	Pike	42.75	35.03	10.57	11.65	11266
	Vigo	39.67	35.45	12.79	12.09	10899
Iowa	Lucas	41.49	30.49	15.39	12.63	10242
	Polk	35.17	36.94	13.88	14.01	10244
Kansas	Cherokee	51.25	33.80	2.50	12.45	12900
	Crawford	46.68	31.23	4.18	17.91	11642
Kentucky	Union	55.63	30.99	5.46	7.92	13239
	Ohio	49.28	32.63	8.04	10.05	10233

TABLE 7 (Continued)

State	County	Fixed Carbon	Volatile Matter	Moisture	Ash	B. T. U.'s per Lb.
Missouri	Randolph	39.82	33.64	12.92	13.62	10548
	Miller	41.05	41.45	12.67	4.83	12487
Montana	Carbon	45.69	32.36	8.56	13.39	10685
	Gallatin	35.38	29.63	4.13	30.86	9095
Ohio	Belmont	49.45	37.61	2.97	9.97	12935
	Jackson	43.80	35.85	9.01	11.34	11495
Pennsylvania	Cambria	73.04	16.82	3.51	6.63	14279
	Fayette	58.29	27.87	5.13	8.71	13365
Utah	Carbon	47.06	42.02	6.05	4.87	13151
Virginia	Tazewell	75.34	17.17	1.63	5.86	14672
	Wise	60.82	31.65	3.05	4.48	14470
W. Virginia	Fayette	74.80	17.10	2.80	5.30	14701
	Marion	55.14	36.77	1.75	6.34	14107
Wyoming	Carbon	41.07	40.32	11.30	7.31	10755

From U. S. Bureau of Mines Bulletin No. 23.

The above valuations were obtained at St. Louis Testing Plant from 139 samples of coal. The heating values of the various coals were established by "actually burning one gram of the air-dried coal in oxygen in a Mahler-bomb calorimeter." These values in B. t. u. give the theoretical thermal value of soft coals for either high or low pressure heating.

The **oil fuels** have been briefly characterized in "Steam" as follows:

"**Petroleum** is practically the only liquid fuel sufficiently abundant and cheap to be used for the generation of steam. It possesses many advantages over coal and is extensively used in many localities.

There are three kinds of petroleum in use, namely those yielding on distillation: 1st, paraffin; 2nd, asphalt; 3rd, olefine. To the first group belong the oils of the Appalachian Range and the Middle West of the United States. These are a dark brown in color with a greenish tinge. Upon their distillation such a variety of valuable light oils are obtained that their use as fuel is prohibitive because of price.

To the second group belong the oils found in Texas and California. These vary in color from a reddish brown to a jet black and are used very largely as fuel.

The third group comprises the oils from Russia, which, like the second, are used largely for fuel purposes.

The light and easily ignited constituents of petroleum, such as naphtha, gasolene and kerosene, are often times driven off by a partial distillation, these products being of greater value for other purposes than for use as fuel. This partial distillation does not

decrease the value of petroleum as a fuel; in fact, the residuum known in trade as "fuel oil" has a slightly higher calorific value than petroleum and because of its higher flash point, it may be more safely handled. Statements made with reference to petroleum apply as well to fuel oil.

In general crude oil consists of carbon and hydrogen, though it also contains varying quantities of moisture, sulphur, nitrogen, arsenic, phosphorus and silt. The moisture contained may vary from less than 1 to over 30 per cent, depending upon the care taken to separate the water from the oil in pumping from the well. As in any fuel, this moisture affects the available heat of the oil, and in contracting for the purchase of fuel of this nature it is well to limit the per cent of moisture it may contain. A large portion of any contained moisture can be separated by settling and for this reason sufficient storage capacity should be supplied to provide time for such action."

The calorific values of petroleum range from 18,000 to 22,000 B. t. u. per pound, and the percentage composition and other data is given in table 8. The **flash point** of crude oil is the temperature at which it begins to give off inflammable gases. This temperature varies greatly for different oils as shown in the table.

TABLE 8

Composition and Calorific Value of Various Oils

Kind of Oil	Per Carbon	Per cent Hydrogen	Per cent Sulphur	Per cent Oxygen	Specific Gravity	Deg. Flash Point	B. t. u. Pound	Authority
#California	85.04	11.52	2.45	0.99*	.....	.....	17871	B. & W. Co
California	81.52	11.51	0.55	6.92*	.....	230	18667	U. S. N. Liquid Fuel Board
Texas	87.15	12.33	0.32	.....	0.908	370	19388	U. S. N.
Texas	87.29	12.32	0.43	.....	0.910	375	19659	U. S. N.
Ohio	83.40	14.70	0.60	1.30	.....	.....	19580	
Pennsylvania	84.90	13.70	.....	1.40	0.886	.....	19210	Booth
West Virginia	84.30	14.10	.....	1.60	0.841	.....	21240	.....

*Includes N. #Per cent moisture = 1.40

The **comparative value of petroleum and coal as fuel may** be summed up to the **advantage of the liquid fuel** as follows: The cost of handling is much lower, both in delivery and in burning same, while for equal heat value much less storage space is required, and this space may be at a distance from the boilers. Higher efficiencies are obtainable, since the combustion is more perfect, less excess air is required, temperatures are more constant, and since smoke is largely eliminated the heating surfaces are correspondingly clean.

The intensity of the fire can be instantly regulated to suit the load requirements, and there is no deterioration from loss of heat value by disintegration due to storage.

The **disadvantage of the liquid fuel** arises from the fact that the oil must have a reasonably high flash point to reduce the danger of explosion, and city ordinances may, in certain cases make its use practically prohibitive. Due to high temperatures of the oil flame the boiler up keep cost may be increased.

The **comparative evaporative power of coal and oil** is given in the table following.

TABLE 9

Evaporation of Water from Coal and Oil

Taken from the U. S. Geological Report on Petroleum for 1900.

1 Pound of Combustible	Pounds of water evaporated at 212° per pound of combustible	Barrels of petroleum required to do same amount of evaporation as 1 ton of coal Petroleum 18° to 40° Baume
Pittsburgh lump and nut, Penn...	10.0	4.0
Pittsburgh nut and slack, Penn...	8.0	3.2
Anthracite, Pennsylvania.....	9.8	3.9
Indiana Block.....	9.5	3.8
Georges Creek lump, Maryland..	10.0	4.0
New River, West Virginia.....	9.7	3.8
Pocahontas lump, West Virginia..	10.5	4.2
Cardiff lump, Wales.....	10.0	4.0
Cape Breton, Canada.....	9.2	3.7
Nanaimo, British Columbia.....	7.3	2.9
Co-operative, British Columbia..	8.9	3.6
Greta, Washington.....	7.6	3.0
Carbon Hill, Washington.....	7.6	3.0

Under favorable conditions 1 pound of oil will evaporate from 14 to 16 pounds of water from and at 212°; 1 pound of coal will evaporate from 7 to 10 pounds of water from and at 212°; 1 pound of natural gas (21.9 cu. ft.) will evaporate from 18 to 20 pounds of water from and at 212°

The burning of petroleum fuel or oil can only be accomplished in steam boiler practice by the use of suitable burners, which must atomize the oil so thoroughly that each particle will be brought in contact with the minimum quantity of air necessary for its complete

combustion before the gases come in contact with any heating surfaces. No localization of the heat must occur at the heating surfaces or trouble will result from overheating and blistering.

The burners may be classified under three general types: 1st, **spray burners,** in which the oil is atomized by steam or compressed air; 2nd, **vapor burners,** in which the oil is converted into vapor and then passed into the fire box; 3rd, **mechanical burners,** in which the oil is atomized by submitting it to high pressure and passing it through a small orifice.

Natural gas has a limited use but is, of course, confined to restricted areas. The best results are secured by using a large number of small burners to which the gas is supplied at a pressure of about 8 ounces. The calculations for amount of gas required to give a certain heating effect should in all cases be based on volume reduced to standard conditions of temperature and pressure, namely 32° F. and 14.7 pounds per sq. in.

The variation in composition and heating value of natural gas is shown in the following table:

TABLE 10

Typical Analysis (By Volume) and Calorific Values of Natural Gas from Various Localities

Locality of Well	H	CH_4	CO	CO_2	N	O
Anderson, Ind.	1.86	93.07	0.73	0.26	3.02	0.42
Findlay, Ohio	.64	93.35	0.41	0.25	3.41	0.39
St. Ive, Pa.	6.10	75.54	Trace	0.34	.....	.....
Pittsburgh, Pa.	9.64	57.85	1.00	.....	23.41	2.10
Pittsburgh, Pa.	20.02	72.18	1.00	0.80	.....	1.10

Locality of Well	Heavy-Hydro-Carbons	H_2S	B. t. u. per cubic foot Calculated*
Anderson, Ind.	0.47	0.15	1017
Findlay, Ohio	0.35	0.20	1011
St. Ive, Pa.	18.12	.....	1117
Pittsburgh, Pa.	6.00	.....	748
Pittsburgh, Pa.	4.30	.....	917

*B. t. u. calculated, using percentages of constituent gases, and separate heat values.

AVERAGE WEIGHT OF COAL

One cubic foot of hard coal weighs about	50 pounds
One cubic foot of soft coal weighs about	40 pounds
One cubic foot of coke weighs about	28 pounds

WATER

Pure water is a chemical compound formed by the union of two volumes of hydrogen gas with one volume of oxygen gas or two parts by weight of hydrogen and 16 parts by weight of oxygen. Water expands when heated from 39.2°F., or temperature of maximum density, to any higher temperature, but contracts when heated from 32° to 39.2° F. 62°F, is known as standard temperature.

At 62° a U. S. gallon equals 231 cubic inches and weighs approximately 8 1-3 pounds. For engineering work it is sufficiently accurate to assume a cubic foot as equal to 7.48 gallons.

At 62° F. the pressure in pounds per square foot—head in feet x 62.36 pounds; or in pounds per square inch—the head in feet x 62.36 pounds divided by 144 or head in feet x 0.443 pounds. If the head is given in inches of water, then the pressure in ounces per square inch is the head divided by 12 x 62.36 divided by 144 x 16 or 1.73 x pressure in ounces per square inch. A column of water 2.309 feet or 27.71 inches high exerts a pressure of 1 pound per square inch at 62°

The specific volume is always the reciprocal of the specific density (weight per cubic foot of water at the same temperature) The weight per cubic foot is given in the table of "Heat Units in Water."

BOILING POINT OF WATER AT VARIOUS ALTITUDES

Boiling Point Degrees Fahr.	Altitude Above Sea Level Ft.	Atmospheric Pressure Pounds per Sq. In.	Barometer Reduced to 30 Degrees Inches	Boiling Point Degrees Fahr.	Altitude Above Sea Level Ft.	Atmospheric Pressure Pounds per Sq. In.	Barometer Reduced to 32 Degrees Inches
184	15221	8.20	16.70	199	6843	11.29	22.90
185	14649	8.38	17.96	200	6304	11.52	23.47
186	14075	8.57	17.45	201	5764	11.76	23.95
187	13498	8.76	17.83	202	5225	12.01	24.45
188	12934	8.95	18.22	203	4697	12.26	24.96
189	12367	9.14	18.61	204	4169	12.51	25.48
190	11799	9.34	19.02	205	3642	12.77	26.00
191	11243	9.54	19.43	206	3115	13.03	26.53
192	10685	9.74	19.85	207	2589	13.30	27.08
193	10127	9.95	20.27	208	2063	13.57	27.63
194	9579	10.17	20.71	209	1539	13.85	28.19
195	9031	10.39	21.15	210	1025	14.13	28.76
196	8481	10.61	21.60	211	512	14.41	29.33
197	7932	10.83	22.05	212	Sea Level	14.70	29.92
198	7381	11.06	22.52				

WATER—Continued

Incrustation is a deposit that is formed on the inside of a boiler and is caused by impurities in the water that are left behind in the boiler. If the water used in a boiler were perfectly pure, there would be no trouble from incrustation. However, in passing through the soil, water dissolves certain mineral substances, the most important of which are carbonate of lime and sulphate of lime. A quantitative analysis can only be made by an expert chemist having a well equipped laboratory and the proper apparatus, but a test for the most common impurities can easily be made with the aid of chemicals procurable in almost any drug store. Such test will show the kind of impurities present, but will not show the amount.

To test water for carbonate of lime, pour some of the water to be tested into an ordinary tumbler, add a little ammonia and ammonium oxalate and heat to the boiling point. If carbonate of lime is present, a precipitate will be formed.

To test for sulphate of lime, pour some of the water into a tumbler, add a few drops of hydrochloric acid, add a small quantity of a solution of barium chloride and slowly heat the mixture. If a white precipitate is formed which will not redissolve when a little nitric acid is added, sulphate of lime is present.

Carbonate of lime will not dissolve in pure water, but will dissolve in water that contains carbonic acid gas. It becomes insoluble and is precipitated in solid form when the water is heated to about 212, the carbonic acid gas being driven off by the heat.

Sulphate of lime dissolves readily in cold water, but not in hot water. It precipitates in a solid form when the water is heated to about 290.

Sal ammoniac added to water containing carbonate of lime will cause the lime to precipitate, but its use is not recommended when caustic soda can be obtained. While slack lime will precipitate carbonate of lime, it will have no effect on sulphate of lime, and water containing the latter, either alone or in conjunction with carbonate of lime must be treated with other chemicals. The most available ones for water containing both are carbonate of soda and caustic soda. These are fed into the boiler and will precipitate the carbonate of lime and sulphate of lime, requiring the sediment to be blown out periodically.

HEAT UNITS IN WATER

BETWEEN 32 AND 212 DEGREES FAHRENHEIT, AND WEIGHT OF WATER PER CUBIC FOOT

Tem-pera-Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Tem-pera-Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Tem-pera-Degrees F.	Heat Units	Weigh in Pounds per Cubic Foot
32	0.	62.42	123	91.16	61 68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.46	60.79
40	8.	62.42	125	93.17	61.65	170	138.46	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95 18	61.61	172	140.47	60.73
52	20.	62.40	128	96 18	60.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142.49	60.68
56	24.01	62 39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99 20	61 54	176	144.51	60.64
60	28.01	62.37	132	100 20	61.52	177	145 52	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.63	60.57
66	34.02	62.34	135	103.22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61.45	181	149.55	60.53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40.02	62 30	138	106.23	61.41	183	151.57	60.48
74	42.03	62 28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109 25	61.36	186	154.60	60.41
80	48.04	62.23	142	110.26	61.34	187	155.61	60.39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60.34
86	54.06	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.16	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60 06	62.11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	154.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61.97	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123.34	61.08	200	168.75	60.07
108	76.10	61.92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61.86	158	126.36	61.02	203	171.79	60.00
114	82.13	61.83	159	127.37	61.00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60.94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60.90	209	177.86	59.84
120	88.15	61.74	165	133.41	60.87	210	178.87	59.82
121	89.15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

PROPERTIES OF SATURATED STEAM

Vacuum, Inches of Mercury	Absolute Pressure, Lbs. per Sq. Inch	Temperature, Fahrenheit	Total Heat above 32° F.		Latent Heat, Heat-Units	Volume, Cu. Ft. in 1 Lbs. of Steam
			In the Water Heat-Units	In the Steam Heat-Units		
27.88	1	101.83	69.8	1104.4	1034.6	333.0
25.85	2	126.15	94.0	1115.0	1021.0	173.5
23.81	3	141.52	109.4	1121.6	1012.3	118.5
21.78	4	153.01	120.9	1126.5	1005.7	90.5
19.74	5	162.28	130.1	1130.5	1000.3	73.33
17.70	6	170.06	137.9	1133.7	995.8	61.89
15.67	7	176.85	144.7	1136.5	991.8	53.56
13.63	8	182.86	150.8	1139.0	988.2	47.27
11.60	9	188.27	156.2	1141.1	985.0	42.36
9.56	10	193.22	161.1	1143.1	982.0	38.38
7.52	11	197.75	165.7	1144.9	979.2	35.10
5.49	12	201.96	169.9	1146.5	976.6	32.36
3.45	13	205.87	173.8	1148.0	974.2	30.03
1.42	14	209.55	177.5	1149.4	971.9	28.02
Pounds Steam Gauge						
	14.70	212	180.0	1150.4	970.4	26.79
0.3	15	213.0	181.0	1150.7	969.7	26.27
1.3	16	216.3	184.4	1152.0	967.6	24.79
2.3	17	219.4	187.5	1153.1	965.6	23.38
3.3	18	222.4	190.5	1154.2	963.7	22.16
4.3	19	225.2	193.4	1155.2	961.8	21.07
5.3	20	228.0	196.1	1156.2	960.0	20.08
6.3	21	230.6	198.8	1157.1	958.3	19.18
7.3	22	233.1	201.3	1158.0	956.7	18.37
8.3	23	235.5	203.8	1158.8	955.1	17.62
9.3	24	237.8	206.1	1159.6	953.5	16.93
10.3	25	240.1	208.4	1160.4	952.0	16.30
11.3	26	242.2	210.6	1161.2	950.6	15.72
12.3	27	244.4	212.7	1161.9	949.2	15.18
13.3	28	246.4	214.8	1162.6	947.8	14.67
14.3	29	248.4	216.8	1163.2	946.4	14.19
15.3	30	250.3	218.8	1163.9	945.1	13.74
16.3	31	252.2	220.7	1164.5	943.8	13.32
17.3	32	254.1	222.6	1165.1	942.5	12.93
18.3	33	255.8	224.4	1165.7	941.3	12.57
19.3	34	257.6	226.2	1166.3	940.1	12.22
20.3	35	259.3	227.9	1166.8	938.9	11.89

Taken from Kent's Hand Book, 1910.

FACTORS FOR EQUIVALENT EVAPORATION

Temp. of Feed Water in Degrees F.	GAUGE PRESSURE—POUNDS						
	0	1	2	3	4	5	10
212	1.0000	1.0012	1.0019	1.0035	1.0046	1.0056	1.0100
209	1.0026	1.0043	1.0050	1.0066	1.0077	1.0087	1.0131
206	1.0057	1.0074	1.0081	1.0097	1.0108	1.0118	1.0162
203	1.0088	1.0105	1.0112	1.0128	1.0139	1.0149	1.0193
200	1.0119	1.0136	1.0143	1.0160	1.0170	1.0180	1.0225
197	1.0150	1.0167	1.0174	1.0191	1.0201	1.0212	1.0256
194	1.0181	1.0198	1.0205	1.0222	1.0232	1.0243	1.0287
191	1.0212	1.0229	1.0236	1.0253	1.0263	1.0273	1.0318
188	1.0243	1.0260	1.0267	1.0284	1.0294	1.0305	1.0349
185	1.0274	1.0291	1.0298	1.0315	1.0325	1.0336	1.0380
182	1.0305	1.0322	1.0329	1.0346	1.0356	1.0367	1.0411
179	1.0336	1.0353	1.0360	1.0377	1.0387	1.0397	1.0442
176	1.0367	1.0384	1.0391	1.0408	1.0418	1.0428	1.0473
173	1.0398	1.0415	1.0422	1.0439	1.0449	1.0459	1.0504
170	1.0429	1.0446	1.0453	1.0470	1.0480	1.0491	1.0534
167	1.0460	1.0477	1.0484	1.0501	1.0511	1.0521	1.0565
164	1.0490	1.0508	1.0515	1.0532	1.0542	1.0553	1.0596
161	1.5521	1.0539	1.0546	1.0562	1.0573	1.0583	1.0627
158	1.0552	1.0570	1.0577	1.0593	1.0604	1.0614	1.0658
155	1.0583	1.0601	1.0608	1.0624	1.0635	1.0645	1.0689
152	1.0614	1.0632	1.0638	1.0655	1.0666	1.0676	1.0720
149	1.0645	1.0664	1.0669	1.0686	1.0697	1.0707	1.0751
146	1.0676	1.0695	1.0700	1.0717	1.0728	1.0738	1.0782
143	1.0707	1.0725	1.0731	1.0748	1.0758	1.0769	1.0813
140	1.0738	1.0756	1.0762	1.0779	1.0789	1.0800	1.0844
137	1.0768	1.0787	1.0793	1.0809	1.0820	1.0831	1.0875
134	1.0799	1.0818	1.0824	1.0840	1.0851	1.0861	1.0905
131	1.0830	1.0849	1.0854	1.0871	1.0882	1.0892	1.0936
128	1.0861	1.0879	1.0885	1.0902	1.0913	1.0923	1.0967
125	1.0892	1.0910	1.0916	1.0933	1.0944	1.0954	1.0998
122	1.0923	1.0941	1.0947	1.0964	1.0974	1.0985	1.1029
119	1.0953	1.0972	1.0978	1.0995	1.1005	1.1015	1.1060
116	1.0984	1.1002	1.1009	1.1025	1.1036	1.1046	1.1091
113	1.1015	1.1033	1.1039	1.1056	1.1067	1.1077	1.1121
110	1.1046	1.1064	1.1070	1.1087	1.1098	1.1108	1.1162
107	1.1077	1.1095	1.1101	1.1118	1.1128	1.1139	1.1182
104	1.1108	1.1126	1.1132	1.1149	1.1159	1.1170	1.1214
101	1.1138	1.1156	1.1163	1.1179	1.1190	1.1201	1.1245
98	1.1169	1.1187	1.1193	1.1210	1.1221	1.1231	1.1275
95	1.1200	1.1218	1.1224	1.1241	1.1252	1.1262	1.1306
92	1.1231	1.1249	1.1255	1.1272	1.1282	1.1293	1.1337
89	1.1262	1.1280	1.1286	1.1303	1.1313	1.1324	1.1368
86	1.1292	1.1311	1.1317	1.1333	1.1344	1.1355	1.1399
83	1.1323	1.1342	1.1347	1.1364	1.1375	1.1385	1.1429
80	1.1354	1.1372	1.1378	1.1395	1.1406	1.1416	1.1460
77	1.1385	1.1403	1.1409	1.1426	1.1437	1.1447	1.1491
74	1.1416	1.1434	1.1440	1.1457	1.1468	1.1478	1.1522
71	1.1446	1.1465	1.1471	1.1488	1.1498	1.1509	1.1553
68	1.1477	1.1496	1.1502	1.1518	1.1529	1.1540	1.1584
65	1.1508	1.1527	1.1532	1.1549	1.1560	1.1571	1.1615
62	1.1539	1.1557	1.1563	1.1580	1.1591	1.1601	1.1645
59	1.1570	1.1588	1.1594	1.1611	1.1622	1.1632	1.1676
56	1.1601	1.1619	1.1625	1.1642	1.1653	1.1663	1.1707
53	1.1631	1.1650	1.1656	1.1673	1.1684	1.1694	1.1738
50	1.1662	1.1681	1.1687	1.1704	1.1715	1.1725	1.1769
47	1.1693	1.1712	1.1718	1.1735	1.1746	1.1756	1.1800
44	1.1724	1.1743	1.1749	1.1766	1.1777	1.1787	1.1831
41	1.1755	1.1774	1.1780	1.1797	1.1808	1.1818	1.1862
38	1.1786	1.1815	1.1811	1.1828	1.1839	1.1849	1.1891
35	1.1818	1.1836	1.1842	1.1859	1.1870	1.1880	1.1924
32	1.1849	1.1867	1.1873	1.1890	1.1901	1.1911	1.1955

NUMBER OF GALLONS IN ROUND TANKS

DIAMETER, INCHES

Depth or Length	18-inch.	24-inch.	30-Inch.	36-inch.	42-inch.	48-inch.	54-inch.	60-inch.	66-inch.	72-inch.
1 Inch	1.10	1.96	3.06	4.41	5.99	7.83	9.91	12.24	14.81	17.62
1 ft.	13.	23.	37.	53.	72.	94.	119.	147.	178.	211.
1½ ft.	20.	35.	55.	79.	108.	141.	179.	220.	267.	317.
2 ft.	26.	47.	73.	106.	144.	188.	238.	294.	355.	423.
2½ ft.	33.	59.	92.	132.	180.	235.	298.	367.	444.	529.
3 ft.	40.	71.	110.	159.	216.	282.	357.	441.	533.	634.
3½ ft.	46.	82.	129.	185.	252.	329.	417.	514.	622.	740.
4 ft.	53.	94.	147.	211.	288.	376.	476.	587.	711.	846.
4½ ft.	59.	106.	165.	238.	324.	423.	536.	661.	800.	952.
5 ft.	66.	118.	183.	264.	360.	470.	597.	734.	889.	1157.
5½ ft.	73.	129.	202.	291.	396.	517.	657.	808.	977.	1263.
6 ft.	79.	141.	220.	317.	432.	564.	714.	881.	1066.	1369.
7 ft.	92.	164.	257.	370.	504.	658.	833.	1028.	1244.	1580.
8 ft.	106.	188.	294.	423.	576.	752.	952.	1175.	1422.	1792.
9 ft.	119.	212.	330.	476.	648.	846.	1071.	1322.	1599.	2003.
10 ft.	132.	235.	367.	529.	720.	940.	1190.	1469.	1777.	2115.
12 ft.	157.	282.	440.	634.	864.	1128.	1428.	1762.	2133.	2537.
14 ft.	185.	329.	514.	740.	1008.	1316.	1666.	2056.	2488.	2960.
16 ft.	211.	376.	587.	846.	1152.	1504.	1904.	2350.	2844.	3383.
18 ft.	238.	423.	661.	952.	1296.	1692.	2142.	2644.	3199.	3806.
20 ft.	264.	470.	734.	1057.	1440.	1880.	2380.	2937.	3554.	4229.

One-inch Depth is given to facilitate figurnig intermediate depths.

For tanks having a diameter other than those given in the table, multiply the square of the diameter in inches by the length in feet and multiply this product by 0.0408 to obtain tank capacity in U. S. gallons. When both diameter and length are given in inches, the capacity in U. S. gallons equals $0.0034 \times d^2$ L.

AIR REQUIRED FOR VENTILATION

AN adult must have each hour for respiration and transpiration 215 feet or 215 x .077=16.55 pounds, and generates 290 B. T. U., of which 99 units are in form of vapor and 191 units radiate to surrounding objects.

Good practice requires not less than 1800 cubic feet of air per hour to cover all requirements for each person.

Each cubic foot gas burned requires 8.5 cubic feet air.

Each pound oil burned requires 150 cubic feet air.

Each pound candles burned requires 160 cubic feet air.

B. T. U. generated by an adult per hour, 191.

B. T. U. generated by burning 1 cubic foot gas, 600.

B. T. U. generated by burning 1 pound oil or candles. 15,000 to 18,000.

Average gas burner consumes approximately 4 cubic feet gas per hour, which equals 2,400 B. T. U. per hour.

Each flame from oil lamp, 430 to 515 B. T. U. per hour.

Each candle, 454 to 545 B. T. U. per hour.

B. T. U.—British Thermal Units.

SPECIFICATIONS OF MASSACHUSETTS FOR HEATING AND VENTILATING PUBLIC BUILDINGS, SCHOOLS, ETC.

1. That the apparatus will, with proper management, heat all the rooms including corridors to 70 degrees in any weather.

2. That with the rooms 70 degrees and a difference of not less than 40 degrees between the temperature of the outside air and that of the air entering the room at the warm air inlet, the apparatus will supply at least 30 cubic feet of air per minute for each scholar accommodated in the room.

3. That such supply of air will so circulate in the rooms that no uncomfortable draft will be felt, and that the difference in temperature between any two points on the breathing plane (5 feet) in the occupied portion of a room will not exceed 3 degrees.

4. That vitiated air in amount equal to supply from inlets will be removed through the vent ducts.

Tests are made by anemometer at both inlet and outlet registers to see that the requirements are fulfilled.

VENTILATION

Table Showing the Quantity of Air, in Cubic Feet, Discharged per Minute Through a Flue of Which the Cross-Sectional Area is One Square Foot.

(External Temperature of the Air, 32° Fahr.; Allowance for Friction, 50 Per Cent.)

Height of Flue in Feet	Excess of Temperature of Air in Flue above that of External Air							
	10°	15°	20°	25°	30°	50°	100°	150°
1	34	42	48	54	59	76	108	133
5	76	94	109	121	134	167	242	298
10	108	133	153	171	188	242	342	419
15	133	162	188	210	230	297	419	514
20	153	188	217	242	265	342	484	593
25	171	210	242	271	297	383	541	663
30	188	230	265	297	325	419	593	726
35	203	248	286	320	351	453	640	784
40	217	265	306	342	375	484	684	838
45	230	282	325	363	398	514	724	889
50	242	297	342	383	419	541	765	937
60	264	325	373	420	461	594	835	1006
70	286	351	405	465	497	643	900	1115
80	306	375	453	485	530	688	965	1185
90	324	398	460	516	564	727	1027	1225
100	342	420	485	534	594	768	1080	1325
125	383	468	542	604	662	855	1210	1480
150	420	515	596	665	730	942	1330	1630

Above table for Gravity Ventilation taken from standard authorities but not guaranteed.

B. T. U. REQUIRED FOR HEATING AIR

This table specifies the quantity of heat in British thermal units required to raise one cubic foot of air through any given temperature interval.

External Temp.	Temperature of Air in Room									
	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°
-40°	1.802	2.027	2.252	2.479	2.703	2.928	3.154	3.379	3.604	3.829
-30°	1.540	1.760	1.980	2.200	2.420	2.640	2.860	3.080	3.300	3.520
-20°	1.290	1.505	1.720	1.935	2.150	2.365	2.580	2.795	3.010	3.225
-10°	1.051	1.262	1.473	1.684	1.892	2.102	2.311	2.522	2.732	2.943
0°	0.822	1.028	1.234	1.439	1.645	1.851	2.056	2.262	2.467	2.673
10°	0.604	0.805	1.007	1.208	1.409	1.611	1.812	2.013	2.215	2.416
20°	0.393	0.590	0.787	0.984	1.181	1.378	1.575	1.771	1.968	2.165
30°	0.192	0.385	0.578	0.770	0.963	1.155	1.345	1.540	1.733	1.925
40°	0.000	0.188	0.376	0.564	0.752	0.940	1.128	1.316	1.504	1.692
50°	0.000	0.000	0.184	0.367	0.551	0.735	0.918	1.102	1.286	1.470
60°	0.000	0.000	0.000	0.179	0.359	0.538	0.718	0.897	1.077	1.256
70°	0.000	0.000	0.000	0.000	0.175	0.350	0.525	0.700	0.875	1.049

Above table from F. Schumann's Manual of Heating and Ventilation, pages 64 and 41.

MOISTURE ABSORBED BY AIR

The quantity of water which air is capable of absorbing to the point of maximum saturation, in grains per cubic foot for various temperatures.

Degrees Fahr.	Grains in a Cu. Ft.	Degrees Fahr.	Grains in a Cu. Ft.	Degrees Fahr.	Grains in a Cu. Ft.	Degrees Fahr.	Grains in a Cu. Ft.
—20	0.219	25	1.611	55	4.849	75	9.356
—10	0.356	30	1.958	57	5.191	77	9.961
— 5	0.450	32	2.113	60	5.744	80	10.933
0	0.564	35	2.366	62	6.142	85	12.736
5	0.705	40	2.849	65	6.782	90	14.791
10	0.873	45	3.414	67	7.241	95	17.124
16	1.075	50	4.076	70	7.980	100	19.766
20	1.321	52	4.372	72	8.508	105	22.751

RELATIVE HUMIDITY OF THE AIR

Difference of Temp. Wet and Dry Bulb	Temperature of the Air			Difference of Temp. Wet and Dry Bulb	Temperature of the Air		
	32 Degrees Fahr.	70 Degrees Fahr.	90 Degrees Fahr.		32 Degrees Fahr.	70 Degrees Fahr.	90 Degrees Fahr.
0.5	96	98	98	9.0	12	60	68
1.0	90	95	96	10.0	3	55	65
2.0	79	90	92	12.0	....	48	59
3.0	69	86	88	14.0	....	40	53
4.0	59	81	85	16.0	....	33	47
5.0	50	77	81	18.0	....	26	41
6.0	40	72	78	20.0	....	19	36
7.0	31	68	75	22.0	....	13	32
8.0	21	64	71	24.0	....	7	26

AVERAGE VOLUME OF CONSTITUENT GASES IN AIR PER 10,000 PARTS

Oxygen	2065.94	Ozone	0.015
Nitrogen	7711.60	Aqueous vapor	140.00
Argon (about)	79.00	Nitric acid	0.0
Carbon dioxide	3.36	Ammonia	0.005

PROPERTIES OF AIR

Temp. Degrees Fahrenheit	B. T. U. absorbed by 1 Cubic Foot Dry Air per Degree Fahr.	B. T. U. absorbed by 1 Cubic Foot Saturated Air per Degree Fahr.	Cubic Feet Dry Air warmed 1 Degree per B. T. U.	Cubic Feet Saturated Air warmed 1 Degree per B. T. U.
0	0.02056	0.02054	48.5	48.7
12	0.02004	0.02006	50.1	50.0
22	0.01961	0.01963	51.1	51.0
32	0.01921	0.01924	52.0	51.8
42	0.01882	0.01884	53.2	52.8
52	0.01847	0.01848	54.0	53.8
60	0.01818	0.01822	55.0	54.6
62	0.01811	0.01812	55.2	54.7
70	0.01777	0.01794	56.3	55.5
72	0.01777	0.01790	56.5	55.8
82	0.01744	0.01770	57.2	56.5
92	0.01710	0.01751	58.6	57.1
100	0.01690	0.01735	59.1	57.8
102	0.01682	0.01731	59.5	57.8
112	0.01651	0.01711	60.6	58.5
122	0.01623	0.01691	61.7	59.1
132	0.01596	0.01670	62.5	59.9
142	0.01571	0.01652	63.7	60.6
152	0.01544	0.01634	65.0	61.5
162	0.01518	0.01616	66.2	62.4
172	0.01494	0.01598	67.1	63.5
182	0.01471	0.01680	68.0	64.2
192	0.01449	.....	68.9	....
202	0.01426	.....	69.5	....
212	0.01406	.....	71.4	....

VOLUME AND DENSITY OF AIR

at Various Temperatures

Temp. Degrees Fahr.	Volume of 1 lb. of Air at Atmospheric Pressure of 14.7 lbs. Cubic Feet	Density or Weight of 1 Cu. Ft. of Air at 14.7 lbs. Pressure Lbs.	Temp. Degrees Fahr.	Volume of 1 lb. of Air at Atmospheric Pressure of 14.7 lbs. Cubic Feet	Density or Weight of 1 Cu. Ft. of Air at 14.7 lbs. Pressure Lbs.
0	11.583	0.086331	210	16.860	0.059313
32	12.387	0.080728	212	16.910	0.059135
40	12.586	0.079439	220	17.111	0.058442
50	12.840	0.077884	240	17.612	0.056774
62	13.141	0.076097	260	18.116	0.055200
70	13.342	0.074950	280	18.621	0.053710
80	13.593	0.073565	300	19.121	0.052297
90	13.845	0.072230	320	19.624	0.050950
100	14.096	0.070942	340	20.126	0.049686
120	14.592	0.068500	360	20.630	0.048476
140	15.100	0.066221	380	21.131	0.047322
160	16.603	0.064088	400	21.634	0.046223
180	16.106	0.062090	425	22.262	0.044920
200	16.606	0.060210	450	22.890	0.043686

Note—Above information is quoted from standard authorities. Not guaranteed.

CLIMATIC TEMPERATURES

LOWEST AND AVERAGE DEGREES IN THE U. S.

***October 1st to May 1st. All stated in Fahrenheit**

(Compiled from U. S. Weather Bureau Records)

State	City	Lowest	*Av.
Ala.	Mobile	− 1	57.7
	Montgomery	− 5	56.1
Ariz.	Flagstaff	−21	34.8
	Phoenix	22	58.9
Ark.	Fort Smith	−15	49.5
	Little Rock	−12	52.0
Cal.	San Diego	32	57.2
	Independence	10	48.7
Col.	Denver	−29	38.4
	Grand Jct	−16	39.2
Conn.	Southington	−19	36.3
D. C.	Washington	−15	42.9
Fla.	Jupiter	24	69.8
	Jacksonville	10	60.9
Ga.	Savannah	8	57.2
	Atlanta	− 8	51.4
Idaho	Boise	−28	39.6
	Lewiston	−18	42.5
Ill.	Chicago	−23	35.9
	Springfield	−22	39.0
Ind.	Indianapolis	−25	40.4
	Evansville	−15	44.1
Ia.	Sioux City	−31	32.1
	Keokuk	−26	37.6
Kan.	Dodge City	−26	....
	Wichita	−22	42.9
Ky.	Louisville	−20	45.0
La.	New Orleans	7	60.5
	Shreveport	− 5	55.7
Me.	Eastport	−21	31.1
	Portland	−17	33.5
Md.	Baltimore	− 7	43.3
Mass.	Boston	−13	37.2
Mich.	Alpena	−27	29.1
	Detroit	−24	35.3
Minn.	Duluth	−41	25.5
	Minneapolis	−33	28.4
Miss.	Meridian	− 6	53.9
	Vicksburg	− 1	56.0
Mo.	Springfield	−29	43.0
	Hannibal	−20	39.7
Mont.	Havre	−55	27.7
	Helena	−42	30.9
Neb.	North Platte	−35	34.6
	Lincoln	−29	35.8
Nev.	Carson City	−22	....
	Winnemucca	−28	37.9
N. H.	Concord	−35	33.1
N. J.	Atlantic City	− 7	41.6
N. Y.	Saranac Lake	−38	34.1
	New York City	6	40.1
N. M.	Roswell	−14	48.9
	Santa Fe	−13	38.0
N. C.	Hatteras	8	53.3
	Charlotte	− 5	49.8
N. D.	Devil's Lake	−51	18.9
	Bismarck	−44	23.5
Ohio	Toledo	−16	36.8
	Columbus	−20	39.8
Okla.	Oklahoma	−17	47.1
Ore.	Baker City	−20	34.1
	Portland	− 2	45.4
Pa.	Pittsburgh	−20	40.8
	Philadelphia	− 6	41.8
R. I.	Providence	− 9	37.5
	Block Island	− 4	39.7
S. C.	Charleston	7	56.9
	Columbia	2	53.5
S. D.	Huron	−43	25.9
	Yankton	−32	31.2
Tenn.	Knoxville	−16	47.0
	Memphis	− 9	50.7
Tex.	Corpus Christi	11	62.7
	Fort Worth	− 8	49.5
Utah	Salt Lake City	−20	39.7
Vt.	Northfield	−32	27.8
Va.	Cape Henry	5	48.6
	Lynchburg	− 5	45.2
Wash.	Seattle	3	44.3
	Spokane	−30	37.0
W. Va.	Parkersburg	−27	41.9
	Elkins	−21	38.8
Wis.	La Crosse	−43	31.2
	Milwaukee	−25	32.4
Wyo.	Cheyenne	−38	33.7
	Lander	−36	29.0

METRIC AND ENGLISH MEASURES

Measures of Length

Metric			English	
1	metre	=	39.37	inches
			3.28	feet
.3048	metre	=	1	foot
1	centimetre	=	.3937	inch
2.54	centimetres	=	1	inch
1	millimetre	=	.03937	inch ($\frac{1}{25}$ inch, nearly)
25.4	millimetres	=	1	inch
1	kilimetre	=	093.61	yards

Measures of Surface

1	square metre	=	10.764	square feet
.0929	square metre	=	1	square foot
1	square centimetre	=	.155	square inch
6.452	square centimetres	=	1	square inch
1	square millimetre	=	.00155	square inch
645.2	square millimetres	=	1	square inch

Measures of Volume

1	cubic metre	=	35.314	cubic feet
.02832	cubic metre	=	1	cubic foot
1	cubic decimetre	=	61.023	cubic inches
			.0353	cubic foot
28.32	cubic decimetres	=	1	cubic foot
16.387	cubic centimetres	=	1	cubic inch
1	cubic centimetres	=	1	millimetre
			.061	cubic inch

Measures of Capacity

1	litre = 1 cubic decimetre	=	61.023	cubic inches
			.0353	cubic foot
			.2202	gallon (Imperial)
			2.202	pounds of water at 62 degrees Fahr.
28.317	litres	=	1	cubic foot (6.25 Imperial gallons)
4.543	litres	=	1	gallon (Imperial)
3.785	litres	=	1	gallon (American)

Measures of Weight

28.35	grammes	=	1	ounce avoirdupois
1	kilogramme	=	2.2046	pounds
.4536	kilogramme	=	1	pound
1	metric ton	=	.9842	ton of 2240 lbs., or
1000	kilogrammes	=	19.68	cwts. of 2204.6 lbs.
1.016	metric tons	=	1	ton of 2240 pounds
1016	kilogrammes	=		

Miscellaneous

1	gramme per square millimetre	=	1.422	lbs. per square inch
1	kilogramme per square millimetre	=	1422.32	lbs. per square inch
1	kilogramme per square centimetre	=	14.223	lbs. per square inch
1.0335	kg. per sq. centimetre 1 atmosphere	=	14.7	lbs. per square inch
0.070308	kilogramme per square centimetre	=	1	lb. per square inch

METRIC AND ENGLISH MEASURES

Measures of Pressure and Weight

1 lb. per square inch..... =	144	lbs. per square foot
	2.0355	inches of mercury at 32 degrees Fahr.
	2.0416	inches of mercury at 62 degrees Fahr.
	2.309	ft. of water at 62 degrees Fahr.
	27.71	inches of water at 62 degrees Fahr.
1 Atmospheric (14.7 lbs. per sq. in.)..... =	2116.3	lbs. per square foot
	33.947	ft. of water at 62 degrees Fahr.
	30	inches of mercury at 62 degrees Fahr.
	29.922	inches of mercury at 32 degrees Fahr.
	760	millimetres of mercury at 32 degrees Fahr.
1 Foot of Water at 62 degrees Fahr..... =	.433	lbs. per square inch
	62.355	lbs. per square foot
1 Inch of Mercury at 62 degrees Fahr..... =	.491	lb. or 7.86 oz. per sq. in.
	1.132	ft. of water at 62 degrees Fahr.
	13.58	inches of water at 62 degrees Fahr.

MEASURE OF SOLIDITY LIQUID MEASURE

1728 cubic inches =	1 cubic foot	4 gills	make 1 pint
27 cubic feet =	1 cubic yard	2 pints	make 1 quart
		4 quarts	make 1 gallon
		31½ gallons	make 1 barrel

CIRCULAR MEASURE

60 Seconds " = 1 Minute '
60 Minutes ' = 1 Degree °
90 Degrees ° = 1 Quadrant
360 Degrees ° = 1 Circumference

MEASURE OF SURFACE

144 Sq. in. } = 1 Sq. Ft.
183.35 Cir. In. }
90 Sq. Ft. = 1 Sq. Yd.
30¼ Sq. Yds. } = 1 Sq. Rd.
272¼ Sq. Ft. }

Square Inches x .007 = Square Feet
Cubic Inches x .00058 = Cubic Feet

WEIGHTS

1 cubic inch of Cast Iron	weighs	0.260	pounds
1 cubic inch of Wrought Iron	weighs	0.280	pounds
1 cubic inch of Water	weighs	0.036	pounds
1 U. S. Gallon	weighs	8.330	pounds
1 Imperial Gallon	weighs	10.000	pounds
1 U. S. Gallon	equals	231.000	cubic inches
1 Imperial Gallon	equals	277.274	cubic inches
1 cubic foot of Water	equals	7.840	U. S. Gal.
1 pound of Steam	equals	27.222	cubic feet
1 pound of Air	equals	13.817	cubic feet

BOILING POINTS OF VARIOUS FLUIDS

	Degrees		Degrees
Water, Atmospheric Pressure	212	Refined Petroleum	316
Alcohol	173	Turpentine	315
Sulphuric Acid	240	Sulphur	570
		Linseed Oil	597

MELTING POINTS OF DIFFERENT METALS

	Degrees		Degrees
Aluminum	1400	Iron (cast)	2450
Antimony	810	Iron (wrought)	2912
Bismuth	476	Lead	608
Brass	1900	Platinum	3080
Bronze	1692	Silver (pure)	1870
Copper	1996	Steel	2503
Glass	2377	Tin	446
Gold (pure)	2590	Zinc	680

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

Weight of One Cubic Foot of Pure Water

At 32 degrees Fahr. (freezing point)	62.418	lbs.
At 39.1 degrees Fahr. (maximum density)	62.425	lbs.
At 62 degrees Fahr. (standard temperature)	62.355	lbs.
At 212 degrees Fahr. (boiling point, under 1 atmosphere)	59.76	lbs.
Imperial gallon = 277.274 cubic inches of water at 62 degrees Fahr. =	10	lbs.
American gallon = 231 cubic inches of water at 62 degrees Fahr. =	8.3356	lbs.

GENERAL DATA

1 Calorie	=	3.968	B. T. U.
1 B. T. U.	=	0.252	Calorie
1 lb. per sq. in.	=	703.08	kilogrammes per m²
1 Kilogramme per m²	=	.00142	lbs. per sq. in.
1 Calorie m²	=	.3687	B. T. U. per sq. ft.
1 B. T. U. per sq. ft.	=	2.712	calories per m²
1 Calorie per m² per degree difference Cent.	=	.2048	B. T. U. per sq. ft. per degree difference Fahr.
1 B. T. U. per sq. ft. per degree difference Fahr.	=	4.882	Calories per m² per degree difference Cent.
1 B. T. U. per lb.	=	.556	Calories per kilog.
1 Calorie per kilog.	=	1.8	B. T. U. per lb.
1 Litre of Coke at 26.3 lbs. per cubic foot.	=	.93 lbs.	
1 lb. of Coke at 26.3 lbs. per cubic foot.	=	1.076	litres
Water expands in bulk from 40 degrees to 212 degrees	=	One twenty-third.	

A cubic inch of water evaporated under ordinary atmospheric pressure is converted into 1 cubic foot of steam (approximately).

TABLE OF DECIMAL EQUIVALENTS OF FRACTIONS OF ONE INCH

1/64	.0156	17/64	.2656	33/64	.5156	49/64	.7656
1/32	.0312	9/32	.2812	17/32	.5312	25/32	.7812
3/64	.0468	19/64	.2968	35/64	.5468	51/64	.7968
1/16	.0625	5/16	.3125	9/16	.5625	13/16	.8125
5/64	.0781	21/64	.3281	37/64	.5781	53/64	.8281
3/32	.0937	11/32	.3437	19/32	.5937	27/32	.8437
7/64	.1093	23/64	.3593	39/64	.6093	55/64	.8593
1/8	.125	3/8	.375	5/8	.625	7/8	.875
9/64	.1406	25/64	.3906	41/64	.6406	57/64	.8906
5/32	.1562	13/32	.4062	21/32	.6562	29/32	.9062
11/64	.1718	27/64	.4218	43/64	.6718	59/64	.9218
3/16	.1875	7/16	.4375	11/16	.6875	15/16	.9375
13/64	.2031	29/64	.4531	45/64	.7031	61/64	.9531
7/32	.2187	15/32	.4687	23/32	.7187	31/32	.9687
15/64	.2343	31/64	.4843	47/64	.7343	63/64	.9843
1/4	.25	1/2	.5	3/4	.75	1	.0

SHOWING THE LOSS IN CONDUCTIVITY OF BOILER PLATE DUE TO DIFFERENCE IN THICKNESS OF SOOT DEPOSIT

Thickness of Soot	Loss Per Cent.
Clean	0.0
1/32"	9.5
1/16"	26.2
1/8"	45.2
1/16"	69.0

*Proceedings, Institute of Marine Engineers, January 6, 1908.

TABLE OF THE WEIGHTS OF GALVANIZED IRON PIPE IN POUNDS PER RUNNING FOOT

Diameter of Pipe Inches	GAUGE OF IRON No. 24	No. 22	No. 20	No. 18	No. 16	Diameter of Pipe Inches	GAUGE OF IRON No. 24	No. 22	No. 20	No. 18	No. 16
5	1 3/4	2	2 1/2	3 5/8	4	28	9 1/2	11 5/8	14	18	21 1/2
6	2 1/8	2 1/2	3	4	4 3/4	30	10	12 1/4	16	19 5/8	23
7	2 1/2	3	3 1/2	4 5/8	5 1/2	32	.....	13 1/8	16	20 3/4	24 5/8
8	2 7/8	3 5/8	4	5 1/4	6 3/4	34	.....	14	17	22	26 1/4
9	3 1/4	3 3/4	4 1/2	5 7/8	7	36	.....	15	18	23 1/4	27 1/8
10	3 1/2	4	5	6 1/2	7 5/8	38	.....	16	19	24 1/2	29 1/2
11	3 5/8	4 1/4	5 1/2	7	8 1/4	40	.....	17	20	26 1/4	31 1/4
12	4	4 5/8	6	7 1/2	9	42	.....	.....	21	28	33
13	4 1/4	5 1/8	6 1/2	8 5/8	10	44	.....	.....	22	29 3/4	35
14	4 5/8	5 1/2	7	8	11	46	.....	.....	23	31 1/2	37
15	5	6	7 1/2	9 5/8	12	48	.....	.....	24	33 1/4	39
16	5 1/2	6 1/2	8	10 1/4	13	50	.....	.....	25	35	41
18	6	7 1/4	9	11 1/2	14 1/4	52	.....	.....	26	36 3/4	43
20	6 1/2	8	10	12 3/4	16 1/2	54	.....	.....	27	38 1/2	45
22	7 1/4	8 3/4	11	14	16 3/4	56	.....	.....	28	40 1/4	47
24	8	9 5/8	12	15 1/4	18 1/2	58	.....	.....	29	42	49
26	8 3/4	10 1/2	13	16 1/2	20	60	.....	.....	30	43 3/4	51

In above table allowance has been made for laps, trimmings, rivets and solder.

The Honeywell Heating Specialty Company recommends the following schedule of radiator tappings.

CAPACITY IN SQUARE FEET OF HOT WATER RADIATION

First Floor	Radiators containing 30 square feet and under	1/2 inch
	Above 30, but not exceeding 60 square feet	3/4 inch
	Above 75, but not exceeding 100 square feet	1 inch
Second Floor	Radiators containing 40 square feet and under	1/2 inch
	Above 40, but not exceeding 100 square feet	3/4 inch
	Above 100 square feet	1 inch
Third Floor	Radiators containing 50 square feet and under	1/2 inch
	Above 50, but not exceeding 125 square feet	3/4 inch
	Above 125 square feet	1 inch

SPECIFIC GRAVITIES AND WEIGHTS OF VARIOUS SUBSTANCES

The Basis for Specific Gravities is Pure Water at 62 Degrees Fahr., Barometer 30 Inches Weight of One Cubic Foot, 62.355 Pounds	Average Specific Gravity Water = 1	Average Weight of One Cu. Ft. Pounds
Air, atmospheric at 60 degrees F., under pressure of one atmosphere, or 14.7 pounds per square inch, weighs 1/815 as much as water	.00123	.0765
Aluminum	2.6	162
Anthracite, 1.3 to 1.84; of Penna., 1.3 to 1.7	1.5	93.5
Anthracite, broken, of any size, loose		52 to 57
Anthracite, broken, moderately shaken		56 to 60
Anthracite, broken, heaped bushel, loose, 77 to 83 lbs		
Anthracite, broken, a ton loose occupies 40 to 43 cu. ft.		
Ash, American White, dry	.61	38
Ashes of soft coal, solidly packed		40 to 45
Brass (copper and zinc), cast, 7.8 to 8.4	8.1	504
Brass, rolled	8.4	524
Brick, best pressed		150
Brick, common and hard		125
Brick, soft inferior		100
Cement, hydraulic. American, Rosendale, ground and loose		56
Cement, hydraulic. American, Rosendale, U. S. struck bush., 70 pounds		
Cement, hydraulic. American, Cumberland, ground, loose		65
Cement, hydraulic. American, Cumberland, ground, thoroughly shaken		85
Cement, hydraulic. English, Portland, a barrel, 400 to 430 pounds		
Cement, hydraulic. American Portland, loose		88
Cement, hydraulic. American Portland, thoroughly shaken		110
Charcoal of pines and oaks		15 to 30
Coal, bituminous, solid, 1.2 to 1.5	1.35	84
Coal, bituminous, solid, Cambria Co., Pa., 1.27–1.34		79 to 84
Coal, bituminous, broken, of any size, loose		47 to 52
Coal, bituminous, 1 ton occupies 43 to 48 cu. ft.		
Coke, loose, good quality		23 to 32
Coke, loose, a heaped bushel, 35 to 42		
Coke, 1 ton occupies 80 to 97 cubic feet		
Earth, common loam, perfectly dry, loose		72 to 80
Earth, common loam, perfectly dry, shaken		82 to 92
Earth, common loam, perfectly dry, rammed		90 to 100
Glass, 2.5 to 3.45	2.98	186
Glass, common window	2.52	157
Granite, 2.56 to 2.88	2.72	170
Ice, .917 to .922	.92	57.4
Iron, cast, 6.9 to 7.4	7.15	446
Iron, grey foundry, cold	7.21	450
Iron, grey foundry, molten	6.94	433
Iron, wrought	7.69	480
Lead, commercial	11.38	709.6
Limestone and marble	2.6	164.4
Lime, quick	1.5	95
Lime, quick, ground, well shaken, per struck bushel 80 pounds		64
Masonry of granite or limestone, well-dressed		165
Mercury, at 32 degrees Fahr	13.62	849
Petroleum	.878	54.8
Pitch	1.15	71.7
Sand, of pure quartz, perfectly dry and loose		90 to 106
Sand, of pure quartz, voids full of water		118 to 129

SPECIFIC GRAVITIES AND WEIGHTS OF VARIOUS SUBSTANCES

The Basis for Specific Gravities is Pure Water at at 62 Degrees Fahr., Barometer 30 inches. Weight on One Cubic Foot, 62.355 Pounds.	Average Specific Gravity. Water = 1.	Average Weight of One Cu. Ft. Pounds
Sand, of pure quartz, very large and small grains, dry	.....	117
Sandstone, 2.1 to 2.73, 131 to 171	2.41	151
Sandstone, quarried and piled, 1 measure solid makes 1¾ (about) piled	.....	86
Snow, fresh fallen	.....	5 to 12
Snow, moistened, compacted by rain	.....	15 to 50
Slate, 2.7 to 2.9	2.8	175
Steel	7.85	489.6
Tar	1	62.355
Water, pure rain, distilled, at 32 degrees Fahr., Bar. 30 inches	.....	62.417
Water, pure rain, distilled, at 62 degrees Fahr. Bar. 30 inches	1	62.355
Water, pure rain, distilled, at 212 degrees Fahr., Bar. 30 Inches	.....	59.7
Water, sea, 1.026 to 1.030	1.028	64.08

SPECIFIC HEAT OF VARIOUS SUBSTANCES

Water	1.0000	Birch	0.4800
Air	0.2375	Oak	0.5700
Oxygen	0.2175	Plaster	0.2000
Nitrogen	0.2438	Glass	0.1937
Hydrogen	3.4090	Brickwork	0.1950
Coal	0.2777	Masonry	0.2159
Coke	0.2010	Cast iron	0.1298
Petroleum	0.4340	Wrought iron	0.1138
Pine	0.4670	Steel (soft)	0.1165

AREA OF CIRCLES

Diameter	Area	Diameter	Area	Diameter	Area	Diameter	Area
1/8	0.0123	10	78.54	30	706.86	65	3318.3
1/4	0.0491	10 1/2	86.59	31	754.76	66	3421.2
3/8	0.1104	11	95.03	32	804.24	67	3535.6
1/2	0.1963	11 1/2	103.86	33	855.30	68	3631.6
5/8	0.3068	12	113.09	34	907.92	69	3739.2
3/4	0.4418	12 1/2	122.71	35	962.11	70	3848.4
7/8	0.6013	13	132.73	36	1017.8	71	3959.2
1	0.7854	13 1/2	143.13	37	1075.2	72	4071.5
1 1/8	0.9940	14	153.93	38	1134.1	73	4185.4
1 1/4	1.227	14 1/2	165.13	39	1194.5	74	4300.8
1 3/8	1.484	15	176.71	40	1256.6	75	4417.8
1 1/2	1.767	16 1/2	188.69	41	1320.2	76	4536.4
1 5/8	2.073	16	201.06	42	1385.4	77	4656.6
1 3/4	2.405	16 1/2	213.82	43	1452.2	78	4778.3
1 7/8	2.761	17	226.98	44	1520.5	79	4901.6
2	3.141	17 1/2	240.52	45	1590.4	80	5026.5
2 1/4	3.976	18	254.46	46	1661.9	81	5153.0
2 1/2	4.908	18 1/2	268.80	47	1734.9	82	5281.0
2 3/4	5.939	19	283.52	48	1809.5	83	5410.6
3	7.068	19 1/2	298.64	49	1885.7	84	5541.7
3 1/4	8.295	20	314.16	50	1963.5	85	5674.5
3 1/2	9.621	20 1/2	330.06	51	2042.8	86	5808.8
3 3/4	11.044	21	346.36	52	2123.7	87	5944.6
4	12.566	21 1/2	363.05	53	2206.1	88	6082.1
4 1/2	15.904	22	380.13	54	2290.2	89	6221.1
5	19.635	22 1/2	397.60	55	2375.8	90	6361.7
5 1/2	23.758	23	415.47	56	2463.0	91	6503.9
6	28.274	23 1/2	433.73	57	2551.7	92	6647.6
6 1/2	33.183	24	452.39	58	2642.0	93	6792.9
7	38.484	24 1/2	471.43	59	2733.9	94	6939.8
7 1/2	44.178	25	490.87	60	2827.4	95	7088.2
8	50.265	26	530.93	61	2922.4	96	7238.2
8 1/2	56.745	27	572.55	62	3019.0	97	7389.8
9	63.617	28	615.75	63	3117.2	98	7542.9
9 1/2	70.882	29	660.52	64	3216.9	99	7697.7

To compute the area of a diameter greater than any in the above table:

RULE.—Divide the dimension by 2, 3, 4, etc., if practicable, until it is reduced to a quotient to be found in the table, then multiply the tabular area of the quotient by the square of the factor. The product will be the area required.

EXAMPLE.—What is area of diameter of 150? 150 ÷ 5 = 30. Tabular area of 30 = 706.88 which × 25 = 17,671.5, area required.

To obtain area of circle, square diameter and multiply by .7854 or square the radius and multiply by 3.1416.

CIRCUMFERENCE OF CIRCLES

Diameter	Circumference	Diameter	Circumference	Diameter	Circumference	Diameter	Circumference
1/8	.3927	10	31.41	30	94.24	64	204.2
1/4	.7854	10 1/2	32.98	31	97.38	66	207.3
3/8	1.178	11	34.55	32	100.5	67	210.4
1/2	1.570	11 1/2	36.12	33	103.6	68	213.6
5/8	1.963	12	37.69	34	106.8	69	216.7
5/4	2.356	12 1/2	39.27	35	109.9	70	219.9
7/8	2.748	13	40.84	36	113.0	71	223.0
1	3.141	13 1/2	42.41	37	116.2	72	226.1
1 1/8	3.534	14	43.98	38	119.3	73	229.3
1 1/4	3.927	14 1/2	45.55	39	122.5	74	232.4
1 3/8	4.319	15	47.12	40	125.6	75	235.6
1 1/2	4.712	15 1/2	48.69	41	128.8	76	238.7
1 5/8	5.105	16	50.26	42	131.9	77	241.9
1 3/4	5.497	16 1/2	51.83	43	135.0	78	245.0
1 7/8	5.890	17	53.40	44	138.2	79	248.1
2	6.283	17 1/2	54.97	45	141.3	80	251.3
2 1/4	7.068	18	56.54	46	144.5	81	254.4
2 1/2	7.854	18 1/2	58.11	47	147.6	82	257.6
2 3/4	8.639	19	59.69	48	150.7	83	260.7
3	9.424	19 1/2	61.26	49	153.9	84	263.8
3 1/4	10.21	20	62.83	50	157.0	85	267.0
3 1/2	10.99	20 1/2	64.40	51	160.2	86	270.1
3 3/4	11.78	21	65.97	52	163.3	87	273.3
4	12.56	21 1/2	67.54	53	166.5	88	276.4
4 1/2	14.13	22	69.11	54	169.6	89	279.6
5	15.70	22 1/2	70.68	55	172.7	90	282.7
5 1/2	17.27	23	72.25	56	175.9	91	285.8
6	18.84	23 1/2	73.82	57	179.0	92	289.0
6 1/2	20.42	24	75.39	58	182.2	93	292.1
7	21.99	24 1/2	76.96	59	185.3	94	295.3
7 1/2	23.56	25	78.54	60	188.4	95	298.4
8	25.13	26	81.68	61	191.6	96	301.5
8 1/2	26.70	27	84.82	62	194.7	97	304.7
9	28.27	28	87.96	63	197.9	98	307.8
9 1/2	29.84	29	91.10	64	201.0	99	311.0

To compute the circumference of a diameter greater than any in the above table:

RULE.—Divide the dimension by 2, 3, 4, etc., if practicable, until it is reduced to a dimension to be found in the table. Take the tabular circumference of this diameter, multiply it by 2, 3, 4, etc., according as it was divided, and the product will be the circumference required.

EXAMPLE.—What is the circumference of a diameter of 125? 125 ÷ 5 = 25. Tabular circumference of 25 = 78.54; 78.54 × 5 = 392.7, circumference required.

To find the diameter of a circle when circumference is given, multiply the given circumference by .31831.

To find circumference of a circle when diameter is given, multiply the given diameter by 3.1416.

NUMBER OF THREADS PER INCH OF SCREW							27	18	18	14	14
NUMBER OF PERFECT THREADS							5.13	5.22	5.40	5.46	5.60
TOTAL LENGTH OF THREAD AND LENGTH OF TAPER AT TOP							.41	.62	.63	.82	.83
LENGTH OF PERFECT THREAD							.19	.29	.30	.39	.40
OUTSIDE DIAMETER OF PERFECT THREAD							.405	.540	.675	.840	1.05
DEPTH OF THREAD							.029	.044	.044	.057	.057
OUTSIDE DIAMETER OF THREAD AT END OF PIPE							.393	.522	.656	.816	1.025
ROOT DIAMETER OF THREAD AT END OF PIPE							.334	.433	.568	.702	.911
TAPER OF THREAD PER INCH OF SCREW							$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{32}$
SIZE OF TAP DRILL							$\frac{21}{64}$	$\frac{27}{64}$	$\frac{11}{32}$	$\frac{37}{64}$	$\frac{11}{16}$
337.72	2526.	.003	.024	.106	14.200	9.431	$\frac{1}{8}$				
185.096	1383.8	.005	.045	.141	10.494	7.074		$\frac{1}{4}$			
100.785	754.36	.009	.082	.177	7.748	5.059			$\frac{3}{8}$		
63.322	473.91	.015	.131	.220	6.141	4.547				$\frac{1}{2}$	
36.116	270.03	.027	.230	.275	4.636	3.638					$\frac{3}{4}$
22.280	166.62	.044	.374	.344	3.641	2.905					
12.867	96.275	.077	.647	.434	2.768	2.301					
9.454	70.733	.105	.881	.497	2.372	2.010					
5.736	42.913	.174	1.453	.622	1.848	1.608					
4.020	30.077	.248	2.073	.753	1.547	1.329					
2.593	19.479	.384	3.201	.916	1.145	1.091					
1.947	14.565	.513	4.281	1.047	1.077	.955					
1.512	11.312	.661	5.512	1.178	.949	.849					
1.207	9.030	.828	6.905	1.309	.848	.764					
.961	7.197	1.039	8.662	1.456	.757	.687					
.666	4.984	1.500	12.510	1.734	.630	.577					
.496	3.717	2.012	16.774	1.996	.544	.501					
.384	2.878	2.598	21.662	2.258	.479	.443					

LENGTH OF PIPE IN FEET CONTAINING ONE U. S. GALLON	LENGTH OF PIPE IN FEET CONTAINING ONE CUBIC FOOT	U. S. GALLONS CONTAINED IN ONE LINEAL FOOT OF PIPE	POUNDS OF WATER CONTAINED IN ONE LINEAL FOOT OF PIPE	SQUARE FEET OF OUTSIDE OR RADIATING SURFACE PER LIN. FT. PIPE	LENGTH OF PIPE IN FEET PER SQUARE FOOT INSIDE SURFACE	LENGTH OF PIPE IN FEET PER SQUARE FOOT OUTSIDE OR RADIATING SURFACE					
							.055	.055	.055	.085	.115
							.068	.088	.091	.109	.113
							.205	.294	.421	.542	.736
										.244	.422
							.19	.29	.30	.39	.40

WROUGHT PIPE DATA

ACTUAL OUTSIDE DIAMETER	ACTUAL INSIDE DIAMETER	OUTSIDE AREA	INSIDE AREA	AREA OF METAL	OUTSIDE CIRCUMFERENCE	INSIDE CIRCUMFERENCE	WEIGHT PER FOOT
.405	.269	.129	.057	.072	1.272	.845	.246
.540	.364	.229	.104	.125	1.696	1.144	.426
.675	.493	.358	.191	.167	2.121	1.549	.570
.840	.622	.554	.304	.250	2.639	1.954	.855
1.050	.824	.866	.533	.333	3.299	2.589	1.140
1.315	1.049	1.358	.864	.494	4.131	3.296	1.690
1.660	1.380	2.164	1.496	.668	5.215	4.335	2.290
1.900	1.610	2.835	2.036	.799	5.969	5.058	2.740
2.375	2.067	4.430	3.356	1.074	7.461	6.494	3.690
2.875	2.469	9.492	4.778	1.704	9.032	7.757	5.850
3.500	3.068	9.621	7.393	2.228	10.996	9.638	7.660
4.000	3.548	12.566	9.887	2.679	12.566	11.146	9.240
4.500	4.026	15.904	12.730	3.174	14.137	12.648	10.900
5.000	4.506	19.635	15.947	3.668	15.708	14.156	12.700
5.563	5.047	24.306	20.006	4.300	17.477	15.856	14.900
6.625	6.065	34.472	28.890	5.582	20.813	19.054	19.200
7.625	7.023	45.664	38.780	6.926	23.955	22.063	23.800
8.625	7.981	58.426	50.027	8.399	27.096	25.073	28.900

11½	11¼	11½	8	8	8	8	8	8	8	8	8	8	
87	6.21	6.33	6.67	7.12	7.60	8.00	8.40	8.80	9.28	10.08	10.88	11.68	
03	1.06	1.07	1.10	1.64	1.70	1.75	1.80	1 85	1.91	2.01	2.11	2.21	
40	.51	.54	.55	.58	.89	.95	1.00	1.05	1.10	1.16	1.26	1.36	1.46
06	131	1.66	1.90	2.37	2.87	3.50	4.00	4.50	5.00	5.56	6.62	7.62	8.62
037	.069	.069	.069	.069	.100	.100	.100	.100	.100	.100	.100	.100	.100
026	.283	1.627	1.866	2.339	2.818	3.443	3.938	4.43	4.93	5.48	6.54	7.54	8.53
011	.144	1.488	1.728	2.201	2.618	3.243	3.738	4.233	4.73	5.28	6.34	7.34	8.33
½	½	½	½	½	½	½	½	½	½	½	½	½	½
¼	1 1/16	1 23/32	2 3/16	2⅝	3¼	3¾	4¼	4¾	5 5/16	6 5/16	7⅜	8⅜	

¾

1

1¼

1½

2

2½

3

3½

4

4½

5

6

7

8

18	.165	.225	.27	.36	.575	.755	.95	1.08	1.30	1.45	1.88	2.35	2 82
91	.133	.140	.145	.154	.203	.216	.226	.237	.247	.258	.280	.301	.322
27	.951	1.272	1.494	1.933	2.315	2.892	3.358	3.818	4.280	4.813	5.751	6.625	7.625
47	.587	.884	1.088	1.491	1.755	2.284	2.716	3.136	3.564	4.063	4.875	5.875	6.875
40	.51	.54	.55	.58	.89	.95	1.00	1.05	1.10	1.10	1.26	1.36	1.46

PRICE OF PIPE PER FOOT

THICKNESS

ACTUAL INSIDE DIAMETER EXTRA STRONG

ACTUAL INSIDE DIAMETER DOUBLE EXTRA STRONG

—INCHES—TOTAL DISTANCE PIPE SCREWS INTO FITTING

METAL WORKER, PLUMBER AND STEAM FITTER
239 WEST 39TH STREET, NEW YORK CITY

SQUARE FEET OF RADIATING SURFACE OF PIPE PER LINEAL FOOT

On all lengths over one foot, fractions less than tenths are added to or dropped.

Length of Pipe in ft.	Size of Pipe									
	¾	1	1¼	1½	2	2½	3	4	5	6
1	.275	.346	.434	.494	.622	.753	.916	1.175	1.455	1.739
2	.5	.7	.9	1.	1.2	1.5	1.8	2.4	2.9	3.5
3	.8	1.	1.3	1.5	1.9	2.3	2.7	3.5	4.4	5.2
4	1.1	1.4	1.7	2.	2.5	3.	3.6	4.7	5.8	7.
5	1.4	1.7	2.2	2.4	3.1	3.8	4.6	5.8	7.3	7.7
6	1.6	2.1	2.6	2.9	3.7	4.5	5.5	7.	8.7	10.5
7	1.9	2.4	3.	3.4	4.4	5.3	6.4	8.2	10.2	12.1
8	2.2	2.8	3.5	3.9	5.	6.	7.3	9.4	11.6	13.9
9	2.5	3.1	3.9	4.4	5.6	6.8	8.2	10.6	13.1	15.7
10	2.7	3.5	4.3	4.9	6.2	7.5	9.1	11.8	14.6	17.4
11	3.	3.8	4.8	5.4	6.8	8.3	10.	12.9	16.	19.1
12	3.3	4.1	5.2	5.9	7.5	9.	11.	14.1	17.4	20.9
13	3.6	4.5	5.6	6.4	8.1	9.8	11.9	15.3	18.9	22.6
14	3.8	4.8	6.1	6.9	8.7	10.5	12.8	16.5	20.3	24.3
15	4.1	5.2	6.5	7.4	9.3	11.3	13.7	17.6	21.8	26.1
16	4.4	5.5	6.9	7.9	10.	12.	14.6	18.8	23.2	27.8
17	4.7	5.9	7.4	8.4	10.6	12.8	15.5	20.	24.7	29.5
18	5.	6.2	7.8	8.9	11.2	13.5	16.5	21.2	26.2	31.3
19	5.2	6.6	8.3	9.4	11.8	14.3	17.4	22.3	27.6	33.1
20	5.5	6.9	8.7	9.9	12.5	15.	18.3	23.5	29.1	34.8
25	6.9	8.6	10.9	12.3	15.6	18.8	22.9	29.3	36.3	43.5
30	8.3	10.4	13.	14.8	18.7	22.5	27.5	35.3	43.6	52.1
35	9.6	12.1	15.2	17.3	21.8	26.3	32.	41.1	50.9	60.8
40	11.	13.8	17.4	19.8	24.9	30.1	36.6	47.	58.2	69.5
45	12.4	15.6	19.5	22.2	28.	33.8	41.2	52.9	65.5	78.2
50	13.8	17.3	21.7	24.7	31.1	37.6	45.8	58.7	72.7	87.
55	15.2	19.0	23.9	27.1	34.3	41.3	50.4	64.6	80.1	95.6
60	16.6	20.8	26.0	29.6	37.3	45.2	55.	70.5	87.3	104.3
65	18.0	22.6	28.2	32.1	40.5	48.8	59.5	76.4	94.5	112.9
70	19.4	24.2	30.4	34.6	43.5	52.7	64.1	82.3	101.9	121.7
75	20.7	26.0	32.6	37.1	46.6	56.5	68.7	88.1	109.1	130.4
80	22.	27.7	34.7	39.6	49.8	60.2	73.3	94.0	116.4	139.1
85	23.4	29.4	36.9	42.0	53.4	63.9	77.8	99.9	123.7	147.9
90	24.8	31.1	39.1	44.5	56.	67.8	82.4	105.8	130.9	156.5
95	26.2	32.9	41.2	46.9	59.6	71.5	87.2	111.6	138.2	165.2
100	27.5	34.6	43.4	49.4	62.2	75.3	91.6	117.5	145.5	173.9

The above table will be found very convenient in estimating the amount of radiating surface in mains, etc.

NOTE—Above information is quoted from standard authorities. Not guaranteed.

MISCELLANEOUS

Absolute zero of temperature is 491.6 Fahrenheit below the melting point of ice, 32° Fahrenheit. It is only necessary to add (491.6°—32°) to the actual thermometer reading to get the absolute temperature. For engineering work 460° is used rather than 459.6°.

HEAT

The unit of heat quantity in the English system is known as a British Thermal Unit= B. t. u. and is the amount of heat required to raise 1 pound of water from 62° to 63° Fahrenheit, while in the French system the unit is called a Calorie and is the amount of heat required to raise 1 kilogram of water from 15° to 16° centigrade (C). Since 1 k. g.= 2.2046 pounds and 1° C =9/5 F, then 1 Cal.= (2.2046 x 9/5)= 3.968 B. t. u. or 1 B. t. u.=.252 Cal. In engineering work it is sufficiently accurate to consider a B. t. u. as the mean or average amount of heat per degree required to raise 1 pound of water from 32° to 212° F.

The specific heat of any substance can be expressed as the number of B t. u. required to raise or lower the temperature of 1 pound at a given temperature 1 degree F.

When heat is added to a substance without change of state we increase its temperature and the heat thus added is known as sensible heat. When heat added to a substance causes a change of state from solid to a liquid, without increasing its temperature, the heat thus added is known as latent heat of fusion, and when heat added causes a change of state from liquid to vapor, the heat thus added is known as latent heat of evaporation. In the case of water at atmospheric pressure, evaporation takes place at 212° F. and the latent heat amounts to 970.4 B. t. u. per pound of water.

Heat by conduction is a molecular transmission of heat, the material in question transmitting the heat from particle to particle of its own substance. This transmission will only occur between any two sections of the material which are at different temperatures. the heat always flowing from the higher to the lower temperature.

Heat by convection is the transmission of heat by the circulation of one substance over the surface of a hotter or colder body.

Heat by radiation is the transmission of heat through a medium commonly known as ether.

AIR

Pure air is a mechanical mixture of oxygen and nitrogen, that is, the oxygen and nitrogen can be separated from each other by purely physical means without regard for other constituents. This mixture is made up as follows:

	By volume	By weight
Oxygen	20.19%	23.15%
Nitrogen	79.09	76.85

The specific density or weight per cubic foot of dry air decreases with the temperature, and, conversely, the specific volume, or volume per pound, which is always the reciprocal of the density, increases with the temperature. See table "Properties of Air."

TELEGRAPH CODE

SPECIAL NOTICE

PLEASE bear in mind the following in using the telegraph code:

1. Telegraph only when the matter is urgent. When a letter will answer the purpose, it is *surer*, as errors in transmission cannot then occur.

2. Where a blank occurs in a sentence, the word or words supplying the blank must *always follow* the code word of the sentence.

3. Except in cablegrams, ten words are as cheap as any number less. Avoid code where the matter can be covered in ten words without it.

4. When ordering, always specify *hard coal* or *soft coal* boilers, for *steam* or *water*, as the case may be.

5. Write plainly and begin each code word with a capital letter.

QUOTATIONS AND CORRESPONDENCE

At what price and how soon can you furnish	Dab
Quote best price on	Dabbling
Quote best price on following radiation	Dado
Wire reply quick	Daft
Specifications to follow within	Dawning
Will wire you to-morrow morning	Dagger
Will write you to-morrow morning	Dainty
Have written	Dairymaid
Answer by first mail	Daisy
Full particulars in letter of	Dale
Have received no reply from you to our letter of	Dally
Referring to your telegram of——	Damask
Referring to your letter of ——	Dame
Referring to our telegram of ——	Dampness
Referring to our letter of ——	Damsel
Referring to telephone communication to-day	Dance
Do not understand the meaning of ——	Dandy
We quote you for immediate acceptance	Danish
F. O. B. factory	Deacon

QUOTATIONS AND CORRESPONDENCE—Continued

Delivered at	Deadhead
F. O. B. factory, published freight allowance	Danger
Terms, 30 days, 2 per cent 10 days	Decapitate
Terms, 60 days, 2 per cent 10 days	Darn
Terms, net cash	Dared
Terms, draft and B/L	Decay
What is carload freight rate to?	Decigram
What is less than carload freight rate to?	Dapper
Best carload freight quoted is	Dare
Best less-than-carload freight rate quoted is	Darkness
Will wire you freight rate soon as received	Darken
Please reply at once to our telegram	Darling

ORDERS AND SHIPMENTS

Ship immediately by freight	Earl
Ship immediately by express	Eater
Ship immediately by express prepaid	Easterly
Ship by first boat	Empire
Ship by best route	Earning
Ship immediately and follow with tracer	Earthquake
Can you ship immediately?	Emperor
Can ship immediately	Elder
Can ship immediately if tapping is regular, otherwise a day or two may be necessary, but can make prompt shipment	Emerge
Can't ship time stated in your order, but can ship promptly	Emption
Ship by same route as our order No.	Eclipse
Ship what you can at once, balance soon as possible	Edict
Do not hold for other orders, but rush without delay	Edify
When will you ship order (No. or date)?	Educate
When and by what route did you ship our order?	Effigy
When can you make shipment?	Editor
Will ship in about	Elect
Your order No. —— was shipped	Element
Order No. —— is ready for shipment	Eligible
Your order ——— is ready for shipment except ——— Shall we make shipment?	Encompass
Hold for instructions. Order (No.)	Elbowing

ORDERS AND SHIPMENTS—Continued

Add to our order (No.)	Egg
Omit ———— from our order (No.)	Elate
Substitute on our order (No.)	Elastic
Duplicate our order (No.)	Electo
Wire trace our order (No.)	Effuse
Give date or number of order referred to	Elephant
Ship as small lot unless car going at once	Edition
We have no car going for —— days	Elevator
Shall we forward as small lot?	Elfin
Will send shipping instructions by mail	Edentate
Shipping instructions for order (No.)	Edge
Enter order at your quotation of	Echo
Enter order as per our inquiry of	Ebonized
Send us bill of lading covering our order (No.)	Eaves
Will mail you to-day bill of lading covering order (No.)	Energetic
Ship with draft attached to bill of lading	Easel
Will ship your order	Enfeebled
When will car be shipped containing our order	Engender
Wire routing on shipment of our order	Enkindle
Routing on your shipment is as follows	Enlighten
Wire instructions	Elixir
Order (No.) has not been shipped	Elope
Your order does not specify steam or water. Wire which is wanted	Elusion
Change our order (No.) to read	Embalm
Referring to your order	Embankment
Referring to our order	Embargo
Do not find any order from you	Emblem
We cannot promise definitely, but will give best attention	Emboss
Include in car for —— which left	Embrace
We cannot furnish	Emetic
Must have —— at once. Can't wait for	Emigrant
Latter part of this week	Enriching
First of next week	Enslave
Latter part of next week	Entertainer

TABLE OF TIME

1 day	Swelling	12 days	Syenite
2 days	Swelter	1 week	Syllabic
3 days	Swerving	2 weeks	Sylphlike
4 days	Swiftness	3 weeks	Symbolic
5 days	Swimming	1 month	Sagacious
6 days	Swingle	2 months	Symmetral
10 days	Swooning	3 months	Sympathetic

NUMERALS

To be used when giving quantities, order numbers, weights, dollars and cents, etc.

1	ON	6	SI	Repeat	X
2	TO	7	VE	Dollars	DO
3	TH	8	EI	Feet	FE
4	FO	9	NI	Discount	Dis
5	IV	0	OH		

EXAMPLES

10155. 1–on 0–oh 1–on 5–iv 5–x (used instead of repeating iv)—onohonivx.

$146.80. 1–on 4–fo 6–si dollars do 8–ei 0–oh—onfosidoeioh.
1,100 feet. 1–on 1–x 0–oh 0–x feet–fe—onxohxfe.
14,000. 1–on 4–fo 0–oh 0–x 0–oh (oh is repeated to avoid having two x's)—onfoohxoh.

In writing telegram use all small letters and join together to make one complete word. To avoid confusion on long numbers it is sometimes advisable to print the characters. In that case, use all capitals, viz.: 1468–ONFOSIEI.

An easy method of deciphering can be used by separating every two letters, starting at the left, except where X appears

ivohxdotosi—iv oh x do to si—500 dollars 26 $500.26

HEIGHT OF RADIATOR

	Inches High		Inches High
Nabbing	12½	Nappal	20½
Nadir	13	Narcissus	22
Naiad	14	Narcotic	23
Naggy	14½	Narrate	26
Nailer	16½	Narrify	32
Namesake	17	Narwhal	38
Napery	18	Nasal	44
Naptha	20	Nasturtium	45

NUMBER OF SECTIONS

	Sections		Sections
Oatmeal	2	Objective	8
Obdurate	3	Oblation	9
Obeisant	4	Oblique	10
Obelisk	5	Oblivion	11
Obesity	6	Oblong	12
Obfuscate	7	Oboe	13

NUMBER OF SECTIONS—Continued

	Sections		Sections
Obscurity	14	Occult	26
Obsequy	15	Occupation	27
Observance	16	Octant	28
Obsession	17	Octillion	29
Obstacle	18	Octonary	30
Obstinate	19	Occular	31
Obtrude	20	Oddity	32
Obtundent	21	Odeon	33
Obvention	22	Odorate	34
Obvolute	23	Offertory	35
Occasional	24	Offspring	36
Occident	25		

TAPPING INSTRUCTIONS

¾-inch single pipe	Tablature	1½ x 1¼-inch	Tamarind
¾ x ¾-inch	Tableau	1½ x 1½-inch	Tandems
1 x ¾-inch	Taciturn	1½-in. single pipe	Tangency
1-in. single pipe	Taffeta	2 x 1½-inch	Tangling
1 x 1-inch	Tactician	2-inch single pipe	Tannery
1¼ x ¾-inch	Taffrail	2 x ½-inch	Tailor
1¼ x 1-inch	Taintless	1½ x ½-inch	Tame
1¼ x 1¼-inch	Tailoress	1¼ x ½-inch	Tamkin
1¼-in. single pipe	Talisman	1 x ½-inch	Tearing
1½ x 1-inch	Talmud	¾ x ½-inch	Tay

Tapped right hand — Tibal
Tapped for extreme top of first section — Timorous
Tapped for extreme top of second section — Tincture
Tapped underneath radiator bottom of first section — Tinkling
Tapped underneath radiator bottom of second section — Tinseled
Tapped for ¼-inch air valve — Tipstaff
All to have extra high solid legs so that distance from floor to center of supply tappings shall be——inches — Titular
Tapped left hand — Ticklish
Tapped for single pipe steam as per list — Tidiness
Tapped for double pipe steam as per list — Tidology
Tapped for top supply and bottom return on same end — Tillage
Tapped for top supply and bottom return opposite ends — Timbrel
Tapped for both supply and return tappings at bottom — Timidity
Tapped regular as per list — Tinning
Tapped for Weber System — Tidbit
Tapped for Paul System — Tiby
Tapped for Webster System — Traducent

Tapped at "A"	Traceable	Tapped at "E"	Tractarian
Tapped at "B"	Tachea	Tapped at "F"	Tractility
Tapped at "C"	Trackless	Tapped at "G"	Tradeful
Tapped at "D"	Tractable	Tapped at "H"	Tradition

NEW TRITON PLAIN RADIATION

Water		Steam
Fable	38–1	Fabulous
Facet	32–1	Facial
Faction	26–1	Fad
Fail	22–1	Faint
Faithful	20–1	Falchion
Fallacy	45–2	Falsehood
Fame	38–2	Family
Famish	32–2	Fanatic
Fandango	26–2	Fang
Fantasia	22–2	Farnia
Farrago	20–2	Fascinate
Fastening	45–3	Fastland
Father	38–3	Fatigue
Fauna	32–3	Fawn
Fealty	26–3	Feasible
Febrile	22–3	Federal
Feldspar	18–3	Felony

	Water Vented for Steam
Felucca	44–4	Finest
Fender	38–4	Fiddle
Ferment	32–4	Fido
Ferocious	26–4	Fingen
Fertile	22–4	Fireman
Festal	18–4	Firm
Fetch	20–5	Fidelity
Fetlock	17–5	Filing
Feudal	14–5	Filbert

TRITON RADIATORS

Triton one-column, ornamental, steam	Cavalier
Triton one-column, ornamental, water	Cavalry
Triton two-column, ornamental, steam	Censure
Triton two-column, ornamental, water	Centaur
Triton three-column, ornamental, steam	Caution
Triton three-column, ornamental, water	Cause
Triton four-column, ornamental, steam	Cave
Triton four-column, ornamental, water	Caverns
Triton five-column, ornamental, steam	Crew
Triton five-column, ornamental, water	Creep
Triton Flue, steam	Candy
Triton Flue, water	Clay

FLORENTINE RADIATORS

Florentine One-column, steam.....Hamlet
Florentine One-column, water.....Haughty
Florentine Two-column, steam.....Harrow
Florentine Two-column, water.....Hanson
Florentine Three-column, steam.....Hammer
Florentine Three-column, water.....Harbor
Florentine Four-column, steam.....Hinder
Florentine Four-column, water.....Harass

GRECIAN RADIATORS

Grecian One-column, plain, steam.....Entity
Grecian One-column, plain, water.....Entwine
Grecian Two-column, plain, steam.....Enervate
Grecian Two-column, plain, water.....Enclouded
Grecian Three-column, plain, steam.....Endure
Grecian Three-column, plain, water.....Enchase
Grecian Four-column, plain, steam.....Enamour
Grecian Four-column, plain, water.....Endivement

TRITON WALL RADIATORS

Triton Wall, No. 5A Steam.....Flank
Triton Wall, No. 5A Water.....Flare
Triton Wall, No. 7A Steam.....Flash
Triton Wall, No. 7A Water.....Flask
Triton Wall, No. 9A Steam.....Flaunt
Triton Wall, No. 9A Water.....Flavor
Triton Wall, No. 7B Steam.....Flaxen
Triton Wall, No. 7B Water.....Flaw
Triton Wall, No. 9B Steam.....Flatten
Triton Wall, No. 9B Water.....Flatter

INDIRECT RADIATORS

Pin Indirect, steam, 10 feet.....Export
Pin Indirect, water, 10 feet.....Expose

Pin Indirect, steam, 15 feet.....Caxton
Pin Indirect, water, 15 feet.....Ceiling
Pin Indirect, steam, 20 feet.....Club
Pin Indirect, water, 20 feet.....Cudgel

Not assembled.....Currycomb

Assembled with Push Nipples.....Curliness
Assembled with R. and L. Screw Nipples.....Cutwater
Arranged for Wall Brackets.....Culinary

DISCONTINUED PATTERNS FOR REPAIRS ONLY

Oldstyle

Triton One-column, plain, steam	Cry
Triton One-column, plain, water	Crayon
Triton Two-column, plain, steam	Cow
Triton Two-column, plain, water	Calf
Triton Three-column, plain, steam	Canvas
Triton Three-column, plain, water	Cart
Triton Four-column, plain, steam	Culpable
Triton Four-column, plain, water	Cultivator
Triton Five-column, plain, steam	Cunning
Triton Five-column, plain, water	Curator
Sun Two-column, steam	Ennoble
Sun Two-column, water	Enode
Sun Three-column, steam	Enliven
Sun Three-column, water	Enmity
Utility Six-column, steam	Enjoyment
Utility Six-column, water	Envenom
Champion Indirect	Englut
Puritan One-column, steam	Handy
Puritan One-column, water	Haggard
Puritan Two-column, steam	Heather
Puritan Two-column, water	Hickory
Puritan Three-column, steam	Hillock
Puritan Three-column, water	History
Puritan Four-column, steam	Halibut
Puritan Four-column, water	Halter
Puritan Five-column, steam	Hanker
Puritan Window, Five-column, water	Happiness
Athenian Wall, five-foot section, steam	Contraband
Athenian Wall, five-foot section, water	Cancerate
Athenian Wall, seven-foot section, steam	Clincher
Athenian Wall, seven-foot section, water	Contour
Athenian Wall, nine-foot section, steam	Continuate
Athenian Wall, nine-foot section, water	Cruciform

SPECIAL RADIATORS

Circular for water	Playmate
Circular for steam	Plaything
Corner for water	Plea
Corner for steam	Pleader
Dining room for water	Pleasance
Dining Room, for steam	Pleasure
With saddles for marble top	Plebeian
With spikes in end section, for marble top	Plenal

PANTRY RADIATOR

No. 1	No. 2	No. 3	No. 4	No. 5
Pliable	Pliform	Plighter	Plodding	Plough

RADIATOR MISCELLANIES

Washed and cleaned for vacuum system....Probation
Triton Three-column Box Bases....Probative
Triton Flue Box Bases....Probity
Puritan and Florentine Box Bases....Procreate
Triton Wall Boxes....Procedure
Sun Box Bases....Procession

ATHENIAN RADIATOR BRACKETS

R No. 1	R No. 2		R No. 3
Proclivity	Proctor		Prodigal
S	T	U	V
Prodigious	Professor	Profuse	Profusion

TRITON WALL RADIATOR BRACKETS

No. A6....Kedge
No. A8....Keelson
No. A10....Keep
No. A12....Kelp
No. A14....Kennel
No. A16....Kermes
No. B5½....Kettle
No. B7½....Khedive
No. B9½....Kidnap
No. C....Kindle
No. D....Kinetic
No. E....Kipper
No. F....Kismet
No. G....Knapsack
No. H....Knead
No. I....Knight
No. L1....Knock
No. L2....Kodak

RADIATOR REPAIRS

Supply Steam Leg Section....Ablative
Supply Steam Leg Section, with supply and return at bottom same end....Ablution
Return Steam Leg Section, open hub....Abnegate
Return Steam Leg Section, blank hub....Aboard
Supply Water Leg Section....Abolition
Return Water Leg Section....Abreast
Intermediate Steam Section....Abroach
Intermediate Water Section....Abrogate
Middle Steam Leg Section....Abrupt
Middle Water Leg Section....Abscess
Slip Nipples for steam radiators....Abscond
Slip Nipples for water radiators....Absolver
Bushings, 2 x ¾ inches....Abstain
Bushings, 2 x 1 inches....Abstemious
Bushings, 2 x 1¼ inches....Abstinence
Bushings, 2 x 1½ inches....Abstruse
Plugs, 2 inches....Abundance
Plugs, 1½ inches....Abutment
Screw Nipples for steam radiation....Acacia
Screw Nipples for water radiation....Academic
Right and Left Screw Nipples with hexagon centers....Acceding

CAPITOL-WINCHESTER BOILER CODE

No.	Steam	Complete Set of Grates
3130	Gab	Rabbi
3140	Gabel	Raccoon
3230	Gabion	Racket
3240	Gadder	Raddle
3330	Gadfly	Radiate
3340	Gaily	Radish
3350	Gain	Raglan
3440	Gait	Raiment
3450	Gale	Rampant
3460	Gallic	Ransack
3540	Gallop	Rebel
3550	Gambol	Recluse
3560	Game	Recoup
3640	Gape	Redowa
3650	Garb	Refuge
3660	Garlic	Regatta

No.	Water	Complete Set of Grates
4130	Madcap	Fakir
4140	Magic	Falcon
4230	Magnate	Fantasia
4240	Majestic	Faro
4330	Malady	Farmer
4340	Mandolin	Fathom
4350	Marine	Figaro
4440	Marquis	Flagon
4450	Mateless	Fluke
4460	Matin	Folio
4540	Matron	Fontein
4550	Mattress	Frappe
4560	Mayas	Fresco
4640	Maypole	Friction
4650	Mediator	Frontier
4660	Military	Fusion

CAPITOL SQUARE BOILERS

No.	Steam	Water	Complete Set of Grates
184	Exact	Phalanx	Vacancy
185	Exalt	Phantasm	Vacation
186	Examine	Phantom	Vacuity
187	Example	Pharisee	Vagabond
225	Excavate	Pharmacy	Vagrant
226	Exceed	Pharynx	Vain
227	Excelsior	Phase	Valance
228	Exception	Pheasant	Valence
255	Excerpt	Phenix	Valet
256	Excess	Phenol	Valid
257	Exchange	Phial	Valor
258	Exchequer	Philippic	Value
G276	Excise	Phillstine	Valve
G277	Exclaim	Philology	Vamp
G278	Exclave	Philosophy	Vandal
G279	Exclude	Philter	Vane
235	Excoriate	Phlegm	Vanity
236	Exculpate	Phonetic	Vantage
237	Excurrent	Phonograph	Vapid
238	Excuse	Phosphate	Vapor
239	Execute	Phosphoric	Variance
240	Executor	Photogen	Varied
WN276	Exegesis	Photosphere	Varlet
WN277	Exemplar	Phrase	Various
WN278	Exempt	Phrenic	Varnish
WN279	Exercise	Phthisis	Vascular
WN280	Exergue	Phycology	Vase
WN281	Exert	Physic	Vassal
WN282	Exeunt	Physician	Vast

CAPITOL GAS BOILERS

3	Xanthic	Yacht
4	Xebec	Yam
5	Xeno	Yank
6	Xeres	Yard
7	Xylene	Yawn
8	Xyloid	Yeggman
9	Xyster	Yellow
10	Xystos	Yeoman

IMPROVED CAPITOL BOILERS

25 SERIES

No.	Steam	Water	Complete Set of Grates
1425	Abate	Alliance	Unabated
425	Ambush	Anvil	Unambushed
1525	Azure	Artic	Unazured
525	Archive	Anchor	Unarchived
1625	Abdicate	Antarctic	Unabdicated
625	Atlas	Applause	Unatlased
1725	Abduct	Album	Unabducted
725	Alcove	Attic	Unalcoved
1825	Abet	Antler	Unabetted
825	Abandon	Area	Unabandoned

IMPROVED CAPITOL BOILERS

37 SERIES

1537	Cursory	Curtain	Uncursed
537	Caliper	Cypress	Uncalipered
1637	Camera	Cactus	Uncamed
637	Cycloid	Cabbage	Uncycloided
1737	Camphor	Culvert	Uncamphored
737	Caller	Cabinet	Uncalled
1837	Curvity	Cadet	Uncurvited
837	Cuttle	Cynic	Uncuttled
1937	Candid	Calendar	Uncalendered
937	Camber	Caboose	Uncambered
2037	Canine	Calico	Uncanined
1037	Cutlass	Cackle	Uncutlassed

FURMAN SECTIONAL BOILERS

Size	Complete Set of Grates	Size	Complete Set of Grates
184	Gyrated	277	Giron
185	Gyration	278	Grafter
186	Gyratory	279	Gisant
187	Gyromancy	337	Guipon
225	Gencive	338	Gunstaf
226	Genope	339	Gymnote
227	Gerboise	340	Gulot
228	Gerant	387	Glossiness
276	Gite	388	Glottal
		389	Glover
		390	Glucose
		391	Glycerin

FURMAN ROUND SECTIONAL BOILERS

Size	Complete Set of Grates	Size	Complete Set of Grates
16–0	Glair	25–0	Gypsy
16–1	Glade	25–1	Gynarchy
16–2	Gussie	25–2	Gymnast
19–0	Glassy	25–3	Gypsum
19–1	Gurgle	29–0	Gleaner
19–2	Gusset	29–1	Gleaming
22–0	Gust	29–2	Glee
22–1	Guttural	29–3	Gluten
22–2	Gutter		
22–3	Gimbal		

IMPROVED CAPITOL BOILERS
48 SERIES

Size	Complete Set of Grates	Size	Complete Set of Grates
1748	Unlanced	1048	Unlathered
748	Unlariated	2148	Unlegended
1848	Unleadered	1148	Unlaureled
848	Unlassoed	2248	Unluminated
1948	Unlectured	1248	Unlymphed
948	Unlatented	2348	Unlucrative
2048	Unlegated	1348	Unlutarated

IMPROVED CAPITOL SOLAR BOILER

No.	Complete Set of Grates	No.	Complete Set of Grates
702	Dewabbling	1803	Dewhipping
1002	Dewadded	1804	Dewalnutting
1003	Dewafering	1805	Deweeviling
1004	Dewagging	2403	Dewamping
1402	Dewaking	2404	Dewarding
1403	Dewalling	2405	Deweltering
1404	Dewaylaying	3303	Dewarfaring
		3304	Dewariling
		3305	Dewarranting

SUNRAY BOILERS

No.	Complete Set of Grates	No.	Complete Set of Grates
54–E	Jabberer	236	Jessamine
55–E	Jabiru	237	Jealousy
65–E	Jacamar	238	Jelly
57–E	Jacent	239	Jay
95–A	Jacknapes	240	Jumbo
96–A	Jackdaw	WN 276	Jailbird
97–A	Jackplane	WN 277	Jalapin
98–A	Jacobin	WN 278	Jambee
326	Jackonet	WN 279	Japhetic
327	Jaculate	WN 280	Janizary
328	Jadery	WN 281	Japanese
329	Jaggery		
235	Jocund		

HOT WATER SUPPLY BOILERS

No.	Code	Complete Set of Grates
2X	Ivory	Saloon
119	Insular	Solitaire
120	Intact	Sombre
62	Iterate	Salutary
63	Itching	Salute
64	Italian	Samaritan

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THE COMPLETE LINE

UNITED STATES RADIATOR CORPORATION